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National Ignition Facility (NIF) Operations Procedures Plan

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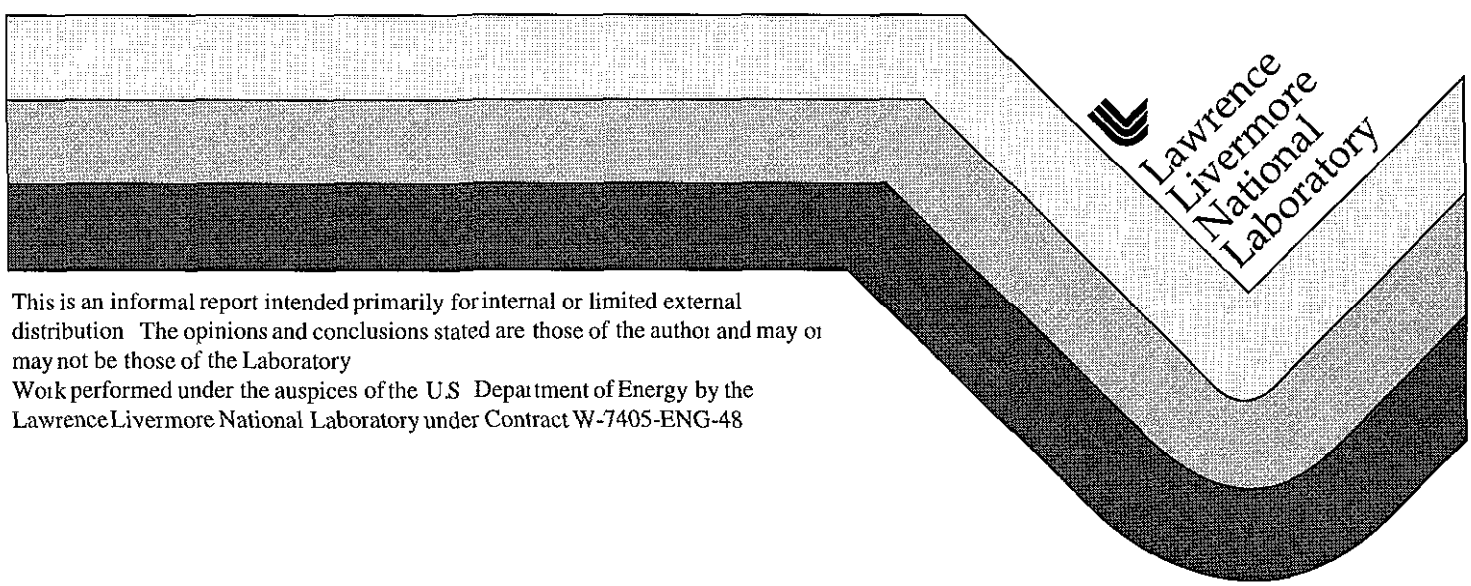
G. Hermes

May 6, 1998



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(Revision 0)

NATIONAL IGNITION FACILITY (NIF)

OPERATIONS PROCEDURES PLAN

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(Revision 0)

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PREFACE

The National Ignition Facility (NIF) is a US Department of Energy (DOE) experimental facility that will be used to study inertial confinement fusion (ICF) and other physical phenomena that occur at very high temperatures and pressures. It will use multiple, high-power, short-pulse laser beams that converge on a small target.

The NIF Startup and Operations Planning Group is responsible for providing the management and technical oversight necessary to ensure a smooth project transition from the construction and equipment development phase of NIF to integrated beam line operation in a fully functional facility. As part of this responsibility, this plan has been developed to address the development and implementation of NIF Operations procedures These procedures are important because it is anticipated that there will be 500 or more discrete technical/engineering tasks or activities involving not only complex equipment but also the safety of operations personnel.

Due to the large number of procedures required, timeliness is an important factor in developing NIF Operations procedures. In addition, all procedures must be in place prior to conducting Operational Readiness Reviews (ORR) which are required before actual NIF operations can begin

NIF Operations procedures include all procedures involving the operation, maintenance, assembly (recurring), and installation (recurring) of NIF facility systems as well as facility administration and training They do not include procedures for one-time facility construction or installation tasks nor do they include Acceptance Test Procedures (ATPs) or Operational Test Procedures (OTPs).

*This work was performed under the auspices of the U S DOE by Lawrence Livermore National Laboratory, Livermore California under Contract No W-7405-Eng-48

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1. INTRODUCTION

1.1 PURPOSE OF PLAN

The purpose of this Operations Procedures Plan is to establish a standard procedure which outlines how NIF Operations procedures will be developed (i.e , written, edited, reviewed, approved, published, revised) and accessed by the NIF Operations staff who must use procedures in order to accomplish their tasks In addition, this Plan is designed to providc a guide to the NIF Project staff to assist them in planning and writing procedures Also, resource and scheduling information is provided

1.2 SCOPE OF PLAN

This Plan is divided into seven sections as follows

(1) Chapter 1, Introduction, which outlines this plan and the basis under which this plan was developed.

(2) Chapter 2, Developing Operations Procedures, which outlines when and how procedures will be developed and published

(3) Chapter 3, Resources and Scheduling, which provides estimates of the amount of effort required and timetables for completion

(4) Chapter 4, Procedures Required, which provides information on the actual procedures required

(5) Chapter 5, Tracking Procedures, which provides a mechanism for tracking procedure status from inception to publication

(6) Chapter 6, Upcoming Activities, which provides a list of tasks to be accomplished during the second half of FY98

(7) Appendices, which include a NIF Operations Procedure Template, Procedure Request Form, List of Procedures Required, a List of Nova Procedures, as well as acronyms and definitions

1.3 PHILOSOPHY OF PLAN

This plan was developed taking into account a number of factors

(1) Experience gained from the existing LLNL Nova facility was used in developing an operations procedure system, many current Nova operators will become NIF operators, and their familiarity with the Nova system will be an asset.

(2) A staff of technically experienced Procedure Writers will be available to the Lead Engineers, procedure owners, or technical experts to write or assist in the writing of procedures. They will oversee the documents through the review, approval, and publication process as well as oversee revisions.

(3) The schedule for writing operations procedures is driven by NIF project milestones (e g , 1st bundle installation, startup, and operation, and Operational Readiness Review (ORR)).

(4) Due to the complexity of NIF equipment and the number of procedures ultimately required as well as NIF Project requirements (ORRs), many operations procedures will initially be written before equipment is fully operational, and subsequent revision will likely be required.

(5) For ease of access for the NIF operations staff and to ensure that only the latest procedures are used, all procedures will be accessible on-line from any networked computer

2. DEVELOPING OPERATIONS PROCEDURES

2.1 INTRODUCTION

The original idea for the organization of NIF Operations Procedures came from the LLNL Nova Facility. Even though specific procedures for NIF will be different from those for Nova, there is much in the Nova Procedure System that can be exploited by NIF. Nova has roughly 200 procedures titles in place (refer to Appendix D). Many of the initial NIF Operations staff are expected to come from Nova, and they will be familiar with following procedures written in the Nova style

In addition, operations procedures from other facilities were reviewed, and some ideas from them were incorporated into this plan. These organizations include Stanford Linear Accelerator Center (SLAC), Lawrence Berkeley National Laboratory (LBNL) Advanced Light Source (ALS), Jefferson Lab/ Continuous Electron Beam Accelerator Facility (CEBAF), and University of Rochester (UR)/Laboratory for Laser Energetics (LLE).

2.2 PURPOSE OF OPERATIONS PROCEDURES

When there exists an operation, process, or sequence of tasks that is too critical, complicated, or lengthy to perform consistently without written guidelines, there is a need for an operations procedure The purpose of a procedure is to provide the user with specific instructions to accomplish a particular task; a procedure may be a set of technical or administrative instructions or a combination of both

NIF Operations procedures may be recommended, requested, or developed by any NIF staff member when deemed necessary with the approval of management. Initially, management will consist of the appropriate Lead Engineer; once a NIF Operations organization is in place, individuals appointed by the NIF Facility Manager will have approval authority

2.3 PROCEDURE ORGANIZATION

The NIF Project is currently organized by system element and a corresponding work breakdown structure (WBS) Once the NIF begins operations, an "operational" structure will replace the current project structure Therefore, the proposed NIF Operations procedures will likely be grouped by "**functional areas**" which are more oriented to the future organizational structure. These functional areas are listed below..

- Alignment AL
- Computer Controls/Network CCN
- General GEN
- Laser Bay LB
- Laser Diagnostics LD
- MOR/PAMMA MP
- Optics Assembly Building OAB
- Optics Processing OP
- Power Conditioning PC
- Precision Diagnostics PD
- Switch Yard SY
- Target Bay TB
- Target Diagnostics TD

The existing WBS/system element structure is related to the future functional areas listed above. This relationship is shown in Table 1 which provides a list of WBS numbers and their corresponding system elements and the functional areas related to them. Any given current system element or WBS may contain a number of functional areas, and any functional area may relate to more than one WBS number

Within a functional area, there will be a further breakdown by type of procedure or "**category**." Categories include:

- Administrative ADMN
- Assembly ASSY
- Installation INST
- Operating OPER
- Maintenance MTNC
- Training TRNG

Some procedures may cross functional areas These will be resolved on a case-by-case basis as the need arises While not all functional areas will have all categories of procedures, it is likely that all WBS elements will.

Table 1. WBS, System Element, and Functional Area Matrix.

NIF Project WBS No.	System Element	NIF Operations Functional Area
1 3	Laser Systems	GEN, LB, OAB, and PC
1.4	Beam Transport Systems	LB and SY
1 5	Integrated Computer Control	AL, CCN, GEN, LB, and MP
1.6	Optical Components	LB, MPC, LD, OAB, OP, PD, SY, and TB
1.7	Laser Control	AL, CCN, LB, MP, and TB
1.8	Target Experimental System	TB and TD
1 9	Operations Special Equipment	LB, OAB, SY, and TB

2.4 PROCEDURE NUMBERING SCHEME

NIF Operations Procedures are maintained by means of a numbering scheme which is organized by functional area as well as by type of procedure Each procedure is assigned an 11-to-13 digit number in accordance with the scheme outlined in Figure 1

If a procedure contains any hazardous or dangerous processes, steps, or materials, the procedure will be given the letter "**A**" after the procedure number This follows the Nova convention. Each portion of the number is explained in the following sections.

2.4.1 Procedure Number

The first part of all NIF Operations Procedures numbers consists of the prefix **NIFOPS**, indicating that this is a NIF Operations Group procedure as opposed to a NIF Project procedure, facility installation, acceptance test, or operational test procedure.

The next two or three letters indicate what functional area the procedure is for For example, procedures related to the Laser Bay will be designated "**LB**" while general procedures such as those dealing with facility access will be designated "**GEN**"

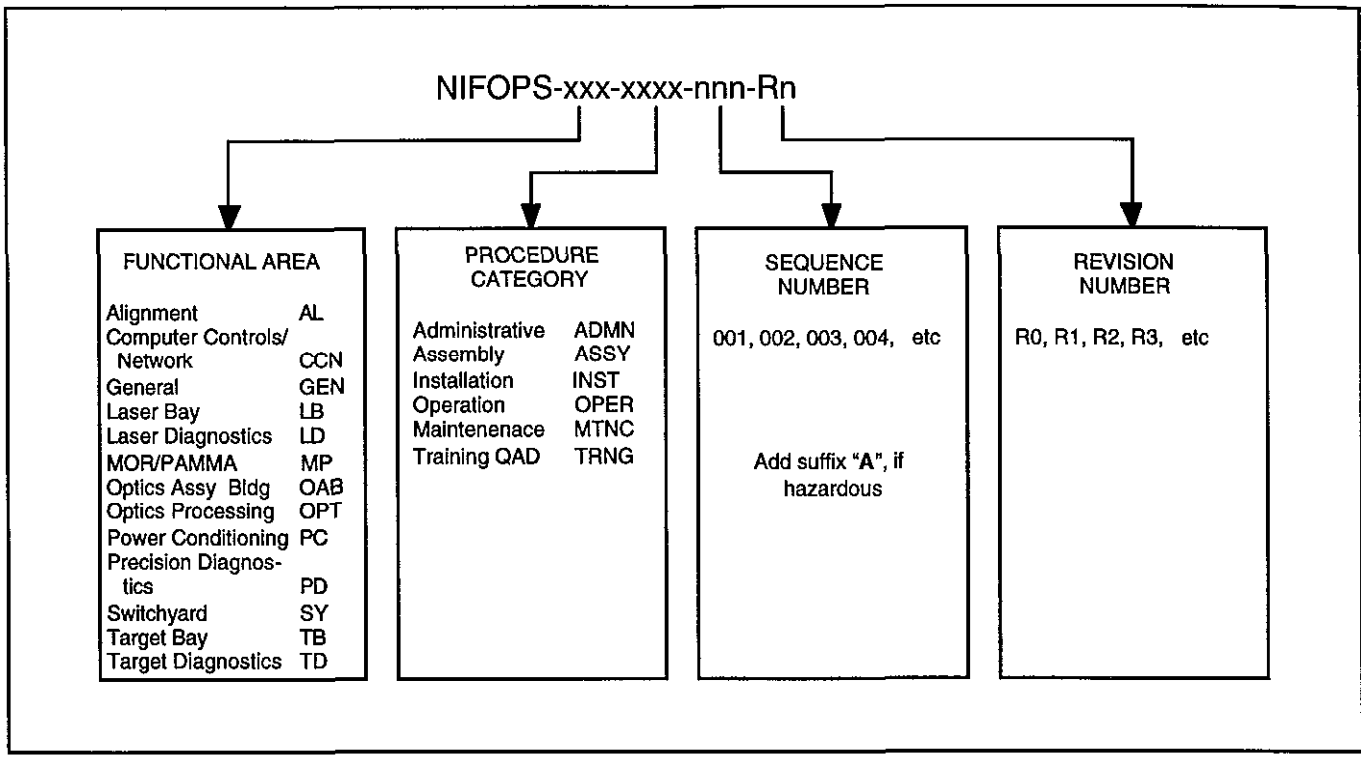


Figure 1. Numbering Scheme for Procedures.

The next four letters indicate the category of the procedure For example, an installation procedure would be designated "**INST**" while an assembly procedure would be designated "**ASSY**."

The sequence number is simply the next number, in numerical sequence, that has not yet been used for a procedure in a particular functional area/procedure type or category. The numbers will begin with 001 and end with 999.

2.4.2 Revision Number

The original issue of a procedure is designated as revision 0 (**R0**). Every subsequent revision of the procedure is designated as **R1**, **R2**, **R3**, and so on. The revision number is assigned by the Procedure Writer when the revision process begins. For example, procedures may be numbered:

NIFOPS-GEN-ADMN-001-R0
(the first version of the first administrative procedure within the functional area "General")
NIFOPS-GEN-TRNG-001-R0
(the first version of the first training document within the functional area "General")

These numbers are assigned by the Procedure Writer when a procedure is initiated

2.4.3 Safety Designation

If a procedure contains any hazardous or dangerous processes, steps, or materials, the procedure will be given the letter "A" after the procedure number, indicating that Class A safety issues are present For example:

NIFOPS-GEN-ADMN-001A-R4

In addition, the "**Hazards**" section of the procedure will indicate the nature of the hazards (refer to Section 2 5, below)

2.5 PROCEDURE FORMAT

All procedures will be written in accordance with the *NIF Operations Procedures Writer's Guide*, using the NIF Operations procedure template. A copy of the template is included in Appendix A. Each procedure will contain certain elements. These include

- **Overview:** A brief description and/or purpose of the procedure and what personnel it is applicable to.
- **Hazards:** Hazards associated with conducting the procedure, if any
- **Location:** Description of the physical location where the procedure is to be performed
- **Applicable documents:** Any documents that must be read prior to or as part of conducting the procedure or any references that may be useful.
- **Equipment required:** Includes any equipment required to perform the procedure.
- **Estimated time required:** An estimate of how long it will take to perform the procedure
- **Prerequisites:** A list of prerequisites that must be satisfied prior to the procedure being performed, including permission from other organizations or individuals, notification that must be provided to other organizations or individuals, prior training that may be required, as well as any other requirements not covered previously.
- **Procedure:** A listing of the steps that comprise the procedure itself. This is the main body of the document.

- **Revision log:** A table listing all revisions to the procedure with a brief description of what the revisions are

- **Keywords:** A list of key words that can be used to search for the procedure in the on-line NIF Operations Procedure System

NIF Operations Procedures may contain drawings, diagrams, illustrations, tables, checklists, and any other information pertinent to the procedure. Some of these documents may be in the PDM-I (Sherpa) database. Procedures may also refer to other procedures or documents. This information may be contained in the body of the procedure text, may be included as appendices, or may be accessible from the procedure directly via electronic link (by clicking on the reference) Safety symbols, outlined in the *NIF Operations Procedures Writer's Guide*, will be used as necessary

For many procedures, a checklist may be part of the procedure. This checklist would be a summary of the more detailed tasks or steps outlined in the procedure itself and be useful for operators who are familiar enough with the procedure to use a condensed version as a guide to performing all steps in the correct order The checklist may also serve as an interactive document which an operator may use to check off steps (on-line) as they are completed, and then file electronically to maintain a record of procedure completion

2.6 PROCEDURE DEVELOPMENT AND REVISION

All NIF Operations procedures will be written using a procedure template (refer to Appendix A) that identifies the procedure as a "NIF Operations" procedure Procedures will be developed through various draft stages with review cycles in between; all will require final approval by the procedure owner, NIF Operations Area Leader, Hazards Control, and the NIF Facility Manager (Prior to a formal NIF Operations organizational structure, the NIF Project Lead Engineer will have approval authority.) The process has been designed to off-load as much work as possible from NIF Project personnel Refer to Figure 2 for a flowchart of procedure development Detailed information on procedure development is provided in Section 2 6.1, below

As NIF Operations procedures require revision, a revision request (refer to Appendix B) will be submitted, and the procedure will be revised. The revision process is similar to the development process with fewer review cycles Minor revisions may require approval only, major revisions may require one or more technical reviews Detailed information on procedure revision is provided in Section 2 6 2, below Exceptions to the standard guidelines of procedure development and revision are provided in Section 2 6.3

2.6.1 Procedure Development

Typically, procedure development begins when the need for a procedure has been identified by a NIF Lead Engineer, NIF operator/technician, or other technical expert The steps, as outlined in the flowchart in Figure 2, are as follows

(1) The need for a procedure is identified by means of a NIF Operations Procedure Request form (refer to Appendix B for a copy) and a procedure title and general contents are specified The initial request may be come from any individual connected with that particular technical area Initially, as the facility is being built, NIF Lead Engineers will be responsible for approving requests for new procedures. As NIF systems and subsystems come on line, areas of responsibility will be assigned to NIF operators. They will then become procedure owners, taking full responsibility for ensuring that procedures exist and are correct and up-to-date.

(2) A rough draft is developed by the technical expert identified by the Lead Engineer or procedure owner in collaboration with the Procedure Writer. From this, the Procedure Writer then prepares the first formal draft by putting the rough draft into the proper format, checking grammar, and ensuring that good quality illustrations are included

(3) The first draft review will be conducted by technicians, technical experts, the NIF Operations Area Leader, LLNL Hazards Control, or any combination of those who are deemed to be appropriate by the Lead Engineer or procedure owner. This review is technical and user intensive and is designed to ensure technical accuracy and clarity. The emphasis during this review should be on technical aspects as well as clarity for users and not form, format, or editorial issues.

NOTE

During any review cycle, reviewers may test the procedure as they deem appropriate.

(4) The results of the first review will then be incorporated into a second draft by the Procedure Writer.

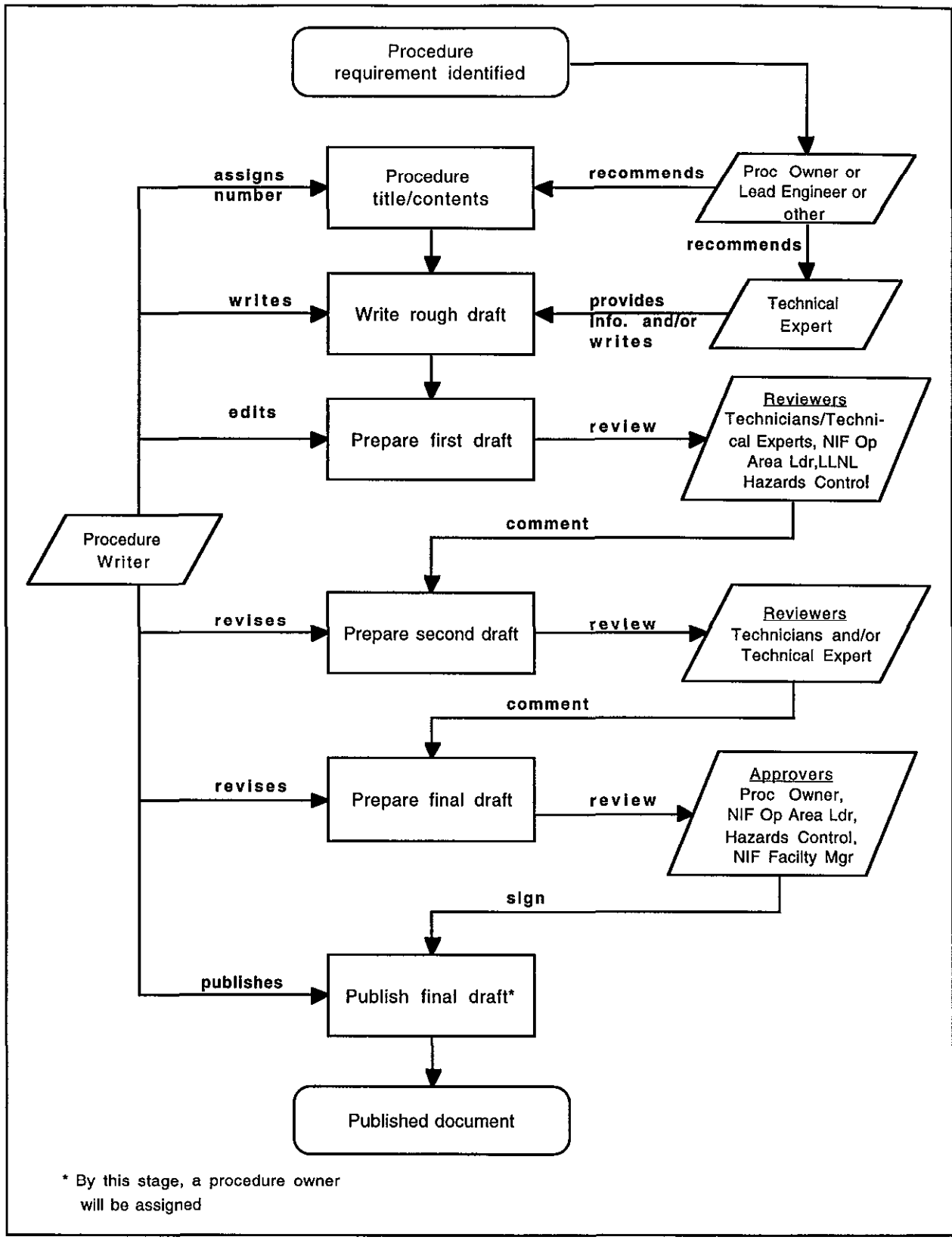


Figure 2. Flowchart for Developing a Procedure.

(5) The second draft review will be conducted by a subset of those who performed the initial technical review to ensure that all changes have been appropriately incorporated The original technical expert who collaborated on the first rough draft will participate in this step to ensure technical accuracy

(6) The results of the second review, if any, will then be incorporated into a final draft by the Procedure Writer

(7) The final draft will be submitted for approval by the procedure owner, NIF Operations Area Leader, the NIF Facility Manager, and Hazards Control, if necessary

NOTE

While reviews are technical in nature and concentrate on technical correctness and clarity, approvals are designed to emphasize overall appropriateness.

(8) The approved procedure will then be published on line (refer to Section 2 7)

2.6.2 Procedure Revision

Procedures are revised in much the same manner as they are developed (refer to the flowchart in Figure 3). The need for a procedure revision is identified by the procedure owner by means of the NIF Operations Procedure Request form, and the procedure owner and Procedure Writer collaborate to revise the procedure For extremely complex procedure revisions, reviews comparable to those for a new procedure may be conducted; for minor changes, the review cycle may be skipped entirely. Approvals, however, are always required.

2.6.3 Exceptions

While the guidelines outlined above for procedure development and revision will typically be followed, there are circumstances that will dictate "short-circuiting" these guidelines. During early installation and operations, procedures may change frequently or rapidly as experience with equipment increases. Some procedures may be in the development stage as the equipment is being installed In such cases, interim procedures, which may be in the form of hand-written or marked up procedures, may be used with the approval of the area or shift supervisor pending formal publication of official procedures. Approval authority in these instances will be established as required

NOTE

At no time shall unapproved procedures be used.

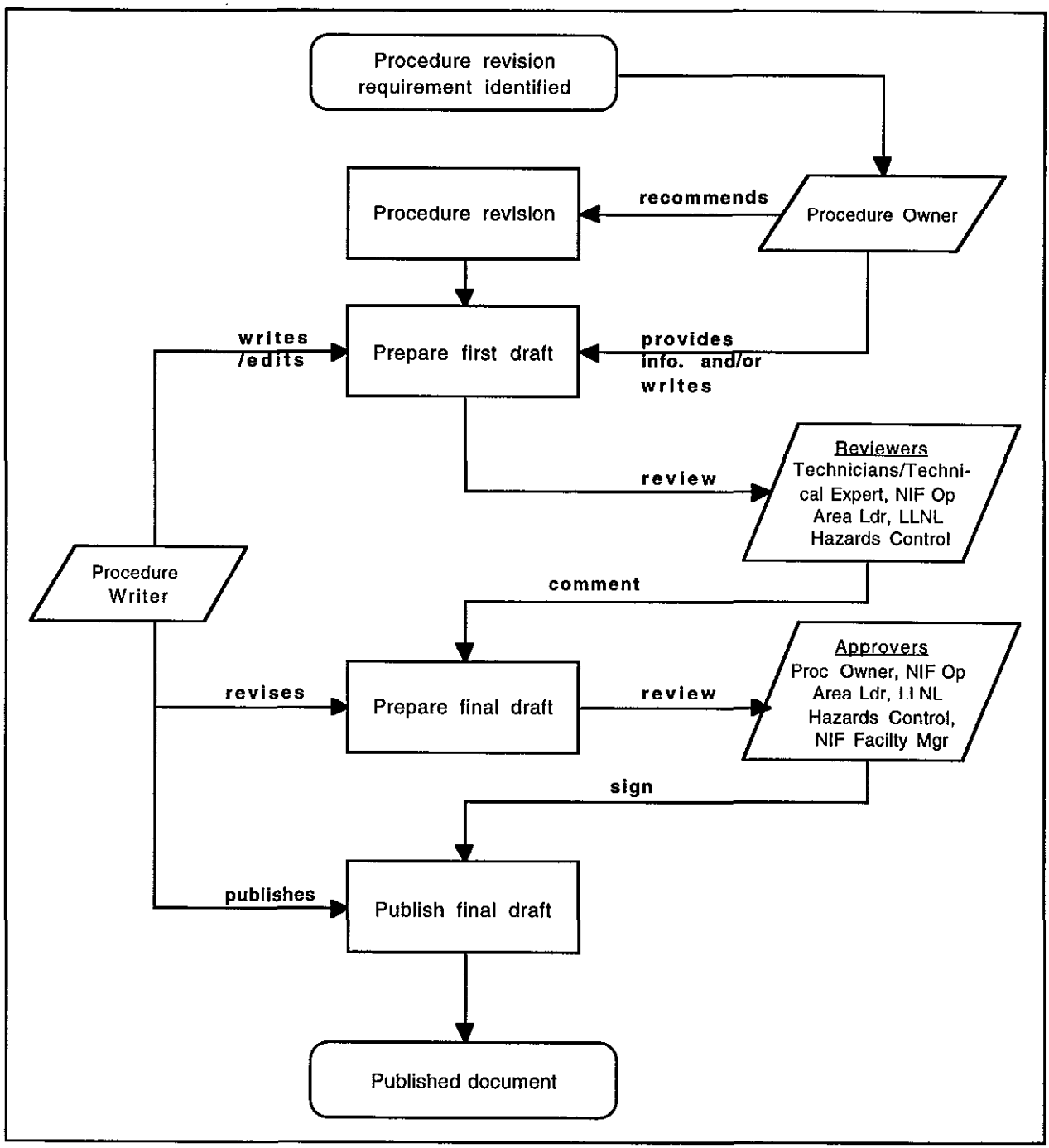


Figure 3. Flowchart for Revising Procedure.

2.7 PROCEDURE PUBLICATION

All NIF Operations procedures will be published on-line, retrievable from various NIF computer sites. In addition, there will be retrieval capability between the NIF Operations Procedures System and the PDM-I and PDM-II data bases (refer to Figure 4) Access will be provided to all LLNL networked computers and authorized networked computers at a number of external locations including Los Alamos National Laboratory (LANL), Sandia National Laboratory (SNL), as well the University of Rochester/Laboratory for Laser Energetics (UR/LLE)

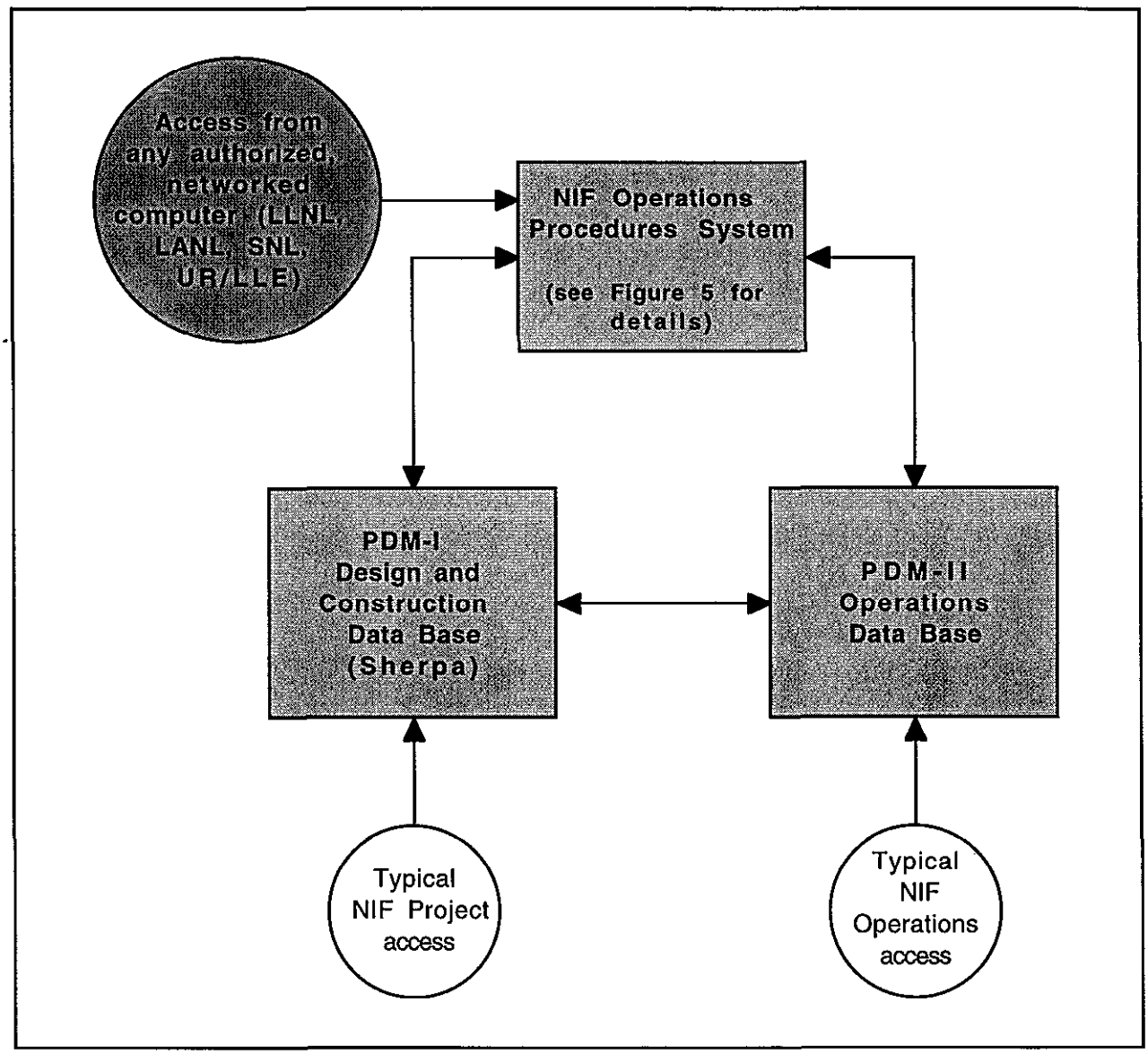


Figure 4. NIF Operations Procedures System Connectivity.

2.7.1 NIF Operations Procedures On-Line System Functionality

The NIF Operations Procedure System will consist of a home page from which access is provided to all procedures There will be an index to all procedures as well as a search capability to enable a user to search by name, procedure number, topic, functional area, category, procedure owner, and key words. From the NIF Operations Procedure System, users will be able to access referenced documents in other data bases. Also, a path will be provided to prior revisions of procedures. Documents will be readable regardless of platform. Figure 5 is a diagram detailing the functionality of the system. Professional programmers will be used to develop the on-line system

All procedures will be available as Adobe Acrobat pdf files; references in procedures will be linked to other .pdf documents as required

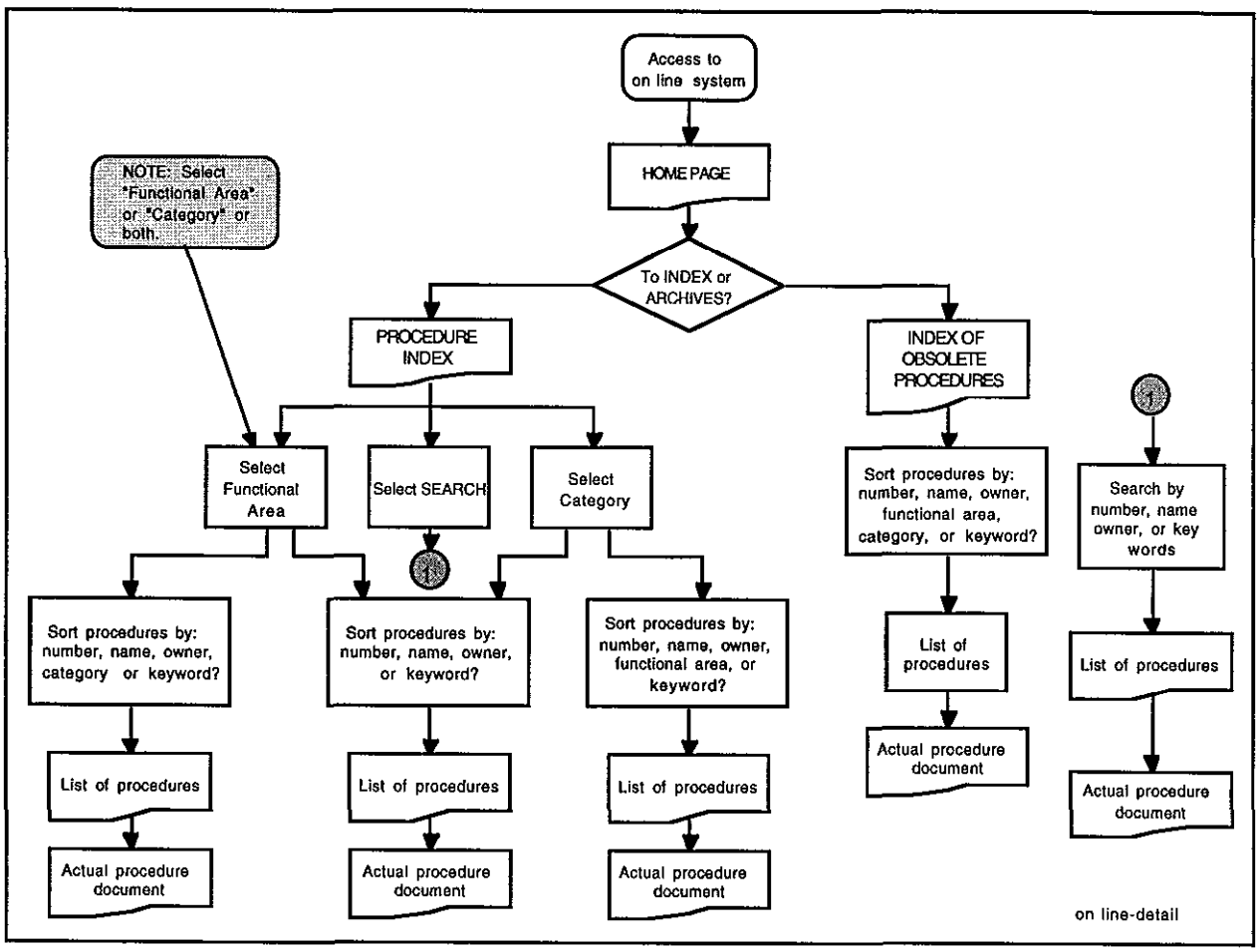


Figure 5. NIF Operations Procedures System Functionality.

2.7.2 NIF Operations Procedures Specifications

The NIF Operations Procedure System will provide the following capability, the implementation details will be determined in the coming months

(1) GENERAL SPECIFICATIONS

- Home page.
- Index of procedures by functional area and procedure category.
- Read and print capability for any procedure or referenced document.
- Edit and publish privileges for Procedure Writers only
- Procedure configuration control (may be provided by PDM-I, Sherpa)

(2) MOVING THROUGH PROCEDURE SYSTEM

- Ability to jump from one page forward or backward or to return to home page.
- Ability to access a reference (engineering drawings, other procedures, document, forms, checklists) by clicking on that reference (including access to PDM-I and PDM-II data bases)
- Ability to return to main document from the reference document
- Ability to "bookmark" procedures frequently used.
- Ability to skip, within a document, to the next relevant section upon answering yes/no.

(3) SEARCHING

- Ability to search by number or any portion of a procedure number.
- Ability to search by functional area or procedure category or both
- Ability to search by title or partial title
- Ability to search by owner
- Ability to search by "key words."

(4) DATE STAMPING

- Every unchanged procedure is automatically date stamped (period to be determined) with an "effective through <date>" notation.
- Changed procedures bear the actual change date until the next automatic date stamping
- Alert when procedure needs to be reviewed (period to be determined).
- Alert when a procedure is under revision.

(5) ARCHIVING

- Automatically archive earlier version when a revised procedure is installed
- Archived (obsolete) procedures accessible with same search capability as current ones

(6) ELECTRONIC LOGGING OF RESPONSES

- When a procedure contains a checklist, responses are logged (filed).
- When a procedure contains interspersed questions which require answers (yes/no, comments, etc), the responses are logged (filed)
- Ability to return to responses and make changes
- Print capability for logged responses.

3. RESOURCES AND SCHEDULE

3.1 INTRODUCTION

Due to the large number of NIF Operations procedures anticipated, resource planning and scheduling are critical factors These must be coordinated with the overall NIF facility design and construction schedule, taking into account when Operational Readiness Reviews are planned and when various systems or subsystems are either installed, activated, or operational. The following sections outline the resources required as well as a proposed schedule based on these factors

3.2 RESOURCES REQUIRED

Estimates of the average amount of time required to develop and publish a NIF Operations procedure were based on a number of factors including the experience of Procedure Writers, LLNL Nova and AVLIS experience, as well as input from the LBNL ALS facility. Based on the information obtained and the assumption that the procedure development scheme outlined in Section 2 5 was followed, Table 2 was developed which shows not only the actual number of hours required but the elapsed time (duration) over which actual work is done. It was assumed that the average procedure length would be about five-to-six pages which is the average length of a Nova procedure Liberal allowances were made for the duration estimates, especially during the review cycles, since personnel availability is anticipated to be a factor Also, a liberal allowance was provided for procedure tracking since it is anticipated that multiple follow-ups with reviewers would be required

It was established that 500 or more NIF Operations procedure would be written. This was based on input from 60% of the current NIF Lead Engineers who identified 268 procedures. By extrapolating, the total number of procedures anticipated comes to 500. From Table 2, the total man-power required to write each procedure is a little more than 50 hours. Of that, a little more than 20 hours are required for the Procedure Writer For 500 documents, this translates to 10,000 man-hours for a Procedure Writer or about 5 man-years.

The duration for producing a procedure (from inception through final approval) for each procedure is expected to average about 2½ months. One or two week turnaround times are allocated for each individual in the process. While multiple reviewers or approvers can work in parallel, it may be overly optimistic to assume that much time saving can be realized

Table 2. Resource Requirements.

Activity	Procedure Writer (hr)	Technical Expert (hr)	Technician (hr)	NIF Oper. Area Ldr. (hr)	NIF Facility Manager (hr)	Hazards Control (hr)	Total Actual Hours	Elapsed Time (weeks)
Produce Rough Draft	4	8					12	1
Produce First Draft	4	2					6	1
First Review								2
Technician Review (3)			12				12	
Oper. Area Leader				1			1	
Hazards Control						1	1	
Produce Second Draft	4	2					6	1
Second Review								1
Technician Review			4				4	
Technical Expert		1					1	
Produce Final Draft	2						2	1
Approval								2
Oper Area Leader				0 5			0.5	
Hazards Control						0.5	0.5	
NIF Facility Manager					0.5		0.5	
Publication	4						4	2
Tracking	4						4	
TOTAL	22 hr.	13 hr.	16 hr.	1.5 hr.	0.5 hr.	1.5 hr.	54.5 hr.	11 wk.

To provide work load leveling over the three plus years that operations procedures will be written, the types of procedures to be written were reviewed with respect to the year in which they could be written. For example, during FY98, many administrative procedures could be written but procedures for equipment to be installed in FY99 could not The results of this review are shown in Table 3

Table 3. Procedures by Fiscal Year.

FY98 (Emphasis on administrative procedures)	FY99 (Emphasis on mature systems with early installation dates)	FY00 (Emphasis on new systems with later installation dates)
Writing, revising, publishing operations procedures	Laser Bay (LB) auxiliary systems	Installation alignment
Training procedures	Conventional mechanical utilities	Optical pulse generation (OPG)
Access and entry (Optical Assy Bldg (OAB) and Laser and Target Area Bldg.(LTAB))	Vacuum/argon systems (Beam Transport System (BTS))	Master Oscillator Room (MOR) and Preamplifier Module Maintenance Area (PAMMA)
Waste handling	Flashlamp cassettes	Preamplifier Module (PAM)
Visitors	Frame Assembly Unit (FAU) cleaning, assembly, alignment, and installation.	Preamplifier Beam Transport Systems (PABTS)
B391 procedures including safety	OAB optical mount alignment	Slab cassettes
Communications system	B391 optics cleaning	Plasma electrode Pockels cells (PEPC)
OAB Large parts cleaning Cranes	OAB safety	LB auxiliary systems Amplifier cooling Nitrogen
Integrated Safety System (ISS) overview	First bundle (B31) component installation	Integrated Computer Control System (ICCS)
	Optical transport and material handling Canister assembly Operations and maintenance Line Replaceable Unit (LRU) transfer LRU installation	Data archiving
	Control Room	Pulse alignment systems
	Optical assembly and alignment Small parts cleaning Spray cleaning Cleanliness verification Metrology LRU assembly	Laser diagnostics
	Optics transport from B391 to OAB	Target area auxiliary systems
	Optics transport from warehouse to OAB	Final optics assembly (FOA)
	Crystal processing/cleaning	LB safety

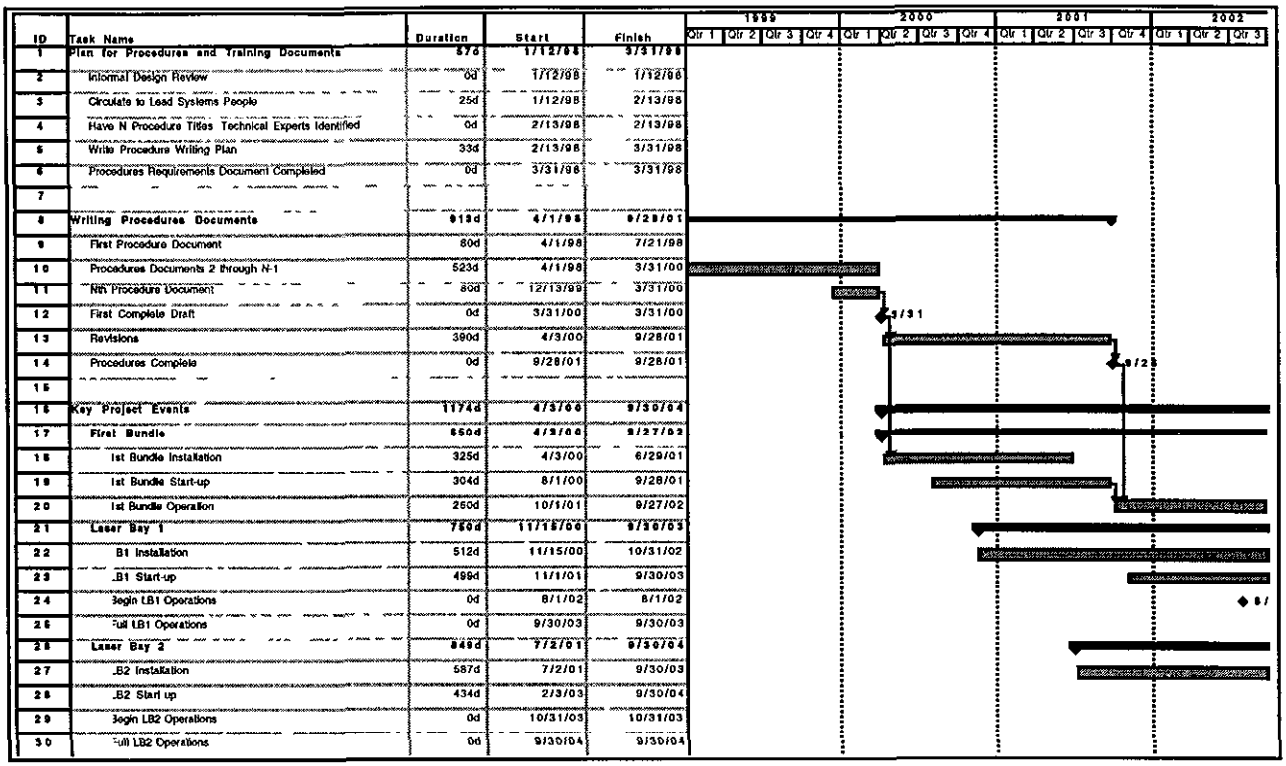
Table 3. Procedures by Fiscal Year (continued).

FY98 (Emphasis on administrative procedures)	FY99 (Emphasis on mature systems with early installation dates)	FY00 (Emphasis on new systems with later installation dates)
	Surveying	Switchyard (SY) and Target Area (TA) safety
	First bundle (B31) controls	LB1 installation
	Safety interlock injection	Precision diagnostics operation
	Facility access	Supervisory controls software
	Power conditioning Installation Module test High-potting Capacitor bank safety	Communications system
	Optical mounts assembly/alignment	
	Timing/fiducial system	
	Integrated Safety System (ISS) Safety interlocks T-1 abort system	
	Wave front control/adaptive optics First wall Beam dumps Vacuum system	

Because the bulk of the procedures will have to by written in FY00, it is imperative that as many procedures as possible be written in FY98 and FY99, even if those procedures are incomplete or partially tested at the time they are initially published.

3.3 SCHEDULE

A schedule showing the NIF Operations procedure writing effort is shown in Figure 6 The schedule provides key milestones in the planning phase and shows key NIF Projects tasks to indicate how procedure writing will fit into the overall NIF Project Schedule.



ID	Task Name	Duration	Start	Finish
1	Plan for Procedures and Training Documents	57d	1/12/98	3/31/98
2	Informal Design Review	0d	1/12/98	1/12/98
3	Circulate to Lead Systems People	25d	1/12/98	2/13/98
4	Have N Procedure Titles Technical Experts Identified	0d	2/13/98	2/13/98
5	Write Procedure Writing Plan	33d	2/13/98	3/31/98
6	Procedures Requirements Document Completed	0d	3/31/98	3/31/98
7				
8	Writing Procedures Documents	913d	4/1/98	9/28/01
9	First Procedure Document	80d	4/1/98	7/21/98
10	Procedures Documents 2 through N-1	523d	4/1/98	3/31/00
11	Nth Procedure Document	80d	12/13/99	3/31/00
12	First Complete Draft	0d	3/31/00	3/31/00
13	Revisions	390d	4/3/00	9/28/01
14	Procedures Complete	0d	9/28/01	9/28/01
15				
16	Key Project Events	1174d	4/3/00	9/30/04
17	First Bundle	550d	4/3/00	9/27/02
18	1st Bundle Installation	325d	4/3/00	6/29/01
19	1st Bundle Start-up	304d	8/1/00	9/28/01
20	1st Bundle Operation	260d	10/5/01	9/27/02
21	Laser Bay 1	750d	11/15/00	9/30/03
22	B1 Installation	512d	11/15/00	10/31/02
23	B1 Start-up	499d	11/1/01	9/30/03
24	Begin LB1 Operations	0d	8/1/02	8/1/02
25	Full LB1 Operations	0d	9/30/03	9/30/03
26	Laser Bay 2	849d	7/2/01	9/30/04
27	B2 Installation	587d	7/2/01	9/30/03
28	B2 Start up	434d	2/3/03	9/30/04
29	Begin LB2 Operations	0d	10/31/03	10/31/03
30	Full LB2 Operations	0d	9/30/04	9/30/04

Figure 6. NIF Project Schedule.

4. PROCEDURES REQUIRED

4.1 INTRODUCTION

A number of procedures have been identified as being required for the NIF facility. These procedures include all functional areas as well as categories. Inputs, by WBS number, were solicited from all NIF Lead Engineers.

4.2 LIST OF PROCEDURES

Appendix C provides a list of all procedures identified by NIF Lead Engineers for each WBS level. They are specified by WBS number (to the fifth level) and by system element. Included is the title and the category of the procedure as well as the name of the technical expert responsible for the procedure. In addition, dates are provided indicating when procedure writing can begin and when it is required

For reference purposes and as an aid in developing a comprehensive list of NIF procedures, a list of Nova procedures titles is provided in Appendix D.

5. TRACKING PROCEDURES

5.1 INTRODUCTION

The progress of the procedure development effort will be tracked throughout its lifetime. Due to the number of review cycles and the number of people that will be involved in this effort, it will be necessary to ensure progress continues uninterrupted In addition, the procedures themselves will be under configuration control

5.2 TRACKING TABLE

The progress of procedure development will be tracked by Procedure Writers via a spreadsheet. Such tracking is particularly important since there are firm deadlines, based on Operational Readiness Reviews and other milestones, and it is necessary to ensure that procedures continue to be developed and published on a regular schedule. In addition, reviewers and approvers will be reminded, if they are delinquent Table 4 shows what elements will be tracked for each procedure

5.3 PROCEDURE CONFIGURATION CONTROL

Configuration control for all developed operations procedures will be provided through the PDM-I (Sherpa) data base. This will ensure that once procedures are on line, revisions as well as periodic reviews will be tracked so that only the most current procedure is available in the active system

Table 4. Operations Procedures Status Report.

Functional Area	Procedure Number	Title	Writer	Technical Expert	Input Date	Input Rec'd.	1st Draft to Review			2nd Draft to Review		
							Complete	Date	Reviewer	Compete	Date	Review

6. UPCOMING ACTIVITIES

During the second half of FY98, the following activities will be taking place with respect to NIF Operations procedures

(1) The NIF Operations Procedures Plan will be coordinated with the NIF Training Plan

(2) A comprehensive list of procedure titles has been solicited from all NIF Lead Engineers to build a complete list of the procedures required.

(3) Schedules for procedure development based on project staff input will be developed and integrated into the overall plan.

(4) NIF Procedure Writers will begin working with programmer, PDM-I and PDM-II data base personnel, and/or system administrators to develop an on-line system for NIF Operations procedure retrieval and configuration control

(5) Forms will be finalized and made available on servers

(6) The first group of procedures will be written and brought on-line.

APPENDICES

APPENDIX A:

PROCEDURE TEMPLATE

APPENDIX A:
PROCEDURE TEMPLATE

To assist Procedure Writers, a procedure template has been developed which contains the "boiler plate" or standard elements required in all procedures Figure A-1 shows the standard procedure template. The template is available on-line on the **NIF** server and is entitled **Procedure Template**.

NIF The National Ignition Facility **NIF OPERATIONS PROCEDURE**	**NIFOPS-** **12/18/97** **Page 1 of**
Title:	
Functional Area	
Prepared by: **Date**	**Approved by:** **Date:** **Approved by:** **Date:**
_____	_____ Functional Area Leader _____ NIF Facility Manager
_____ Procedure Owner	_____ Hazards Control (if necessary) _____ Other
NOTE: See last page for Revision Log.	

1. OVERVIEW
2. HAZARDS
3. LOCATION
4. APPLICABLE DOCUMENTS (click on document name to view)
5. EQUIPMENT REQUIRED
6. ESTIMATED TIME REQUIRED
7. PREREQUISITES
- 7.1 Permission Required
- 7.2 Notification Required
- 7.3 Training Required
- 7.4 Other Requirements
8. PROCEDURE
- 8.1 Definitions
- 8.2 [Begin procedure text]

Revision Log:

Rev. No.	Effective Date	Pages Affected	Brief Description of Revision
0		All	Original issue.

APPENDIX B:

NIF OPERATIONS PROCEDURE REQUEST FORM

APPENDIX B:
NIF OPERATIONS PROCEDURE REQUEST FORM

To create a new or revise an existing procedure, a NIF Operations Procedure Request form should be used. Figure 7 shows a standard Request Form. The electronic version of the form is available on-line on the **NIF** server and is entitled **Procedure Request Form**

NIF The National Ignition Facility — OPERATIONS PROCEDURE REQUEST	Date Submitted:
Title of New Operating Procedure:	
Title of Operating Procedure to be Revised:	**Number:** / **Revision:**

Prepared by: / Date	Approved by: / Date:	Approved by: / Date:
	Functional Area Leader	Other (ES&H, if required)

DATE REQUIRED: _____
(Mandatory)

☐ NEW PROCEDURE

Functional Area Code:

☐	CCN	☐	OPT
☐	GEN	☐	PC
☐	LB	☐	PD
☐	LD	☐	SY
☐	MPC	☐	TB
☐	OAB	☐	TD

Category Code:

- ☐ ADMN
- ☐ ASSY
- ☐ INST
- ☐ OPER
- ☐ MTNC
- ☐ TRNG

☐ PROCEDURE REVISION

Type of Change (check all that apply):

- ☐ Minor Change
- ☐ Major Change
- ☐ Change Involves Safety
- ☐ Critical

Training:

- ☐ Read Only
- ☐ Retraining Required

BRIEF DESCRIPTION OF NEW PROCEDURE OR CHANGE (describe in detail or attach a draft or marked up copy):

Figure B-1. NIF Operations Procedure Request Form.

APPENDIX C:

NIF OPERATIONS PROCEDURE
LIST OF PROCEDURES REQUIRED

APPENDIX C:
NIF OPERATIONS PROCEDURE
LIST OF PROCEDURES REQUIRED

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
13	LASER SYSTEMS		TBD	TBD	TBD	TBD
131	**Optical Pulse Generation (OPG) System**		TBD	TBD	TBD	TBD
1.3.1.1	Master Oscillator Room (MOR)		TBD	TBD	TBD	TBD
1312	Preamplifier		TBD	TBD	TBD	TBD
1313	Preamplifier Beam Transport		TBD	TBD	TBD	TBD
1314	Optical Pulse Generation (OPG) Controls and Diagnostics		TBD	TBD	TBD	TBD
1315	Optical Pulse Generation (OPG) Maint Equipment		TBD	TBD	TBD	TBD
132	**Amplifier System**		TBD	TBD	TBD	TBD
1321	Flashlamp Cassettes	O	Procedure for Physical Inspection of Flashlamp Cassettes	TBD	TBD	TBD
		O	Procedure for Cleanliness Verification of Amplifier Flashlamp Cassettes	TBD	TBD	TBD
		O	Procedure for Determining Routing of Accepted Amplifier Flashlamp Cassettes	TBD	TBD	TBD
		O	Procedure for Disposition of Rejected Amplifier Flashlamp Cassettes	TBD	TBD	TBD
1322	Slab Cassettes	O	Procedure for Physical Inspection of Laser Slabs Received from Vendor	TBD	TBD	TBD
		O	Procedure for Disposition of Rejected Laser Slabs	TBD	TBD	TBD
		O	Procedure for Cleaning and Verifying Laser Slabs	TBD	TBD	TBD
		O	Procedure for Clean Transfer of Slab Cassette Parts	TBD	TBD	TBD
		O	Procedure for Clean Transfer of Laser Slabs	TBD	TBD	TBD
1323	Frame Assembly Units (FAU)	O	Procedure for Physical Inspection of Amplifier Slap Cassette Frame Parts	TBD	TBD	TBD
		O	Procedure for Routing of Accepted Amplifier Slap Cassette Frame Parts	TBD	TBD	TBD
		O	Procedure for Disposition of Rejected Amplifier Slap Cassette Frame Parts	TBD	TBD	TBD
		M	Procedure for Cleaning and Verifying Amplifier Slab Cassette Frame Parts	TBD	TBD	TBD
		A	Procedure for Assembly of Amplifier Slab Cassette Frame Subassembly	TBD	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1324	Support Hardware		TBD	TBD	TBD	TBD
1325	Cooling System		TBD	TBD	TBD	TBD
1326	Assembly/Installation/Test/Maintenance Equipment		TBD	TBD	TBD	TBD
		M	LRU Assembly Equipment Cleaning, Maintenance, and Readiness	TBD	TBD	TBD
		M	Small Tool Cleaning and Staging	TBD	TBD	TBD
		O	Receiving of Clean Parts	TBD	TBD	TBD
		M	Clean Parts Acceptance and Staging	TBD	TBD	TBD
		M	Disposition of Rejected Parts	TBD	TBD	TBD
		A	LRU Final Assembly Procedure	TBD	TBD	TBD
		A	LRU Inspection for Completeness of Assembly	TBD	TBD	TBD
		O	Criteria for Release of LRU to Next Station	TBD	TBD	TBD
		O	Disposition of Rejected LRU	TBD	TBD	TBD
		O	LRU Optical Inspection Equipment Preparation	TBD	TBD	TBD
		O	Transfer of LRU to Optical Inspection Station	TBD	TBD	TBD
		O	LRU Optical Inspection	TBD	TBD	TBD
		O	Disposition of Rejected LRU	TBD	TBD	TBD
133	**Pockels Cell System**		TBD	TBD	TBD	TBD
1331	Switch Pulse Generators (SPG)	I	Installation of PEPC SPG Racks in LTAB	Rhodes, Biltoft, Bettenhausen	TBD	TBD
		O	Operation of PEPC SPGs for NIF	Rhodes, Biltoft, Bettenhausen	TBD	TBD
		M	Maintenance of PEPC SPGs for NIF	Rhodes, Biltoft, Bettenhausen	TBD	TBD
1332	Plasma Pulse Generators (PPG)	I	Installation of PEPC PPG Racks in LTAB	Rhodes, Biltoft, Bettenhausen	TBD	TBD
		O	Operation of PEPC PPGs for NIF	Rhodes, Biltoft, Bettenhausen	TBD	TBD
		M	Maintenance of PEPC PPGs for NIF	Rhodes, Biltoft, Bettenhausen	TBD	TBD
1333	Pockels Cell System Controls and Diagnostics	A	Assembly of Controls and Diagnostics for the PEPC Subsystem in LTAB	BettenhausenRhodes, Biltoft	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
		I	Installation of Controls and Diagnostics for the PEPC subsystem in LTAB	BettenhausenRhodes, Biltoft	TBD	TBD
		O	Operation of Controls and Diagnostics for the PEPC Subsystem for NIF	BettenhausenRhodes, Biltoft	TBD	TBD
		M	Maintenance of Controls and Diagnostics for the PEPC Subsystem for NIF	BettenhausenRhodes, Biltoft	TBD	TBD
1334	Gas Cell Assemblies (LRUs)	A	Assembly of LRUs for the PEPC Subsystem in OAB	Biltoft, Rhodes, Bettenhausen	TBD	TBD
		I	Installation of LRUs for the PEPC Subsystem in LTAB	Biltoft, Rhodes, Bettenhausen	TBD	TBD
		O	Operation of LRUs for the PEPC Subsystem for NIF	Biltoft, Rhodes, Bettenhausen	TBD	TBD
		M	Operation of LRUs for the PEPC Subsystem for NIF	Biltoft, Rhodes, Bettenhausen	TBD	TBD
1335	Structural Support		TBD	TBD	TBD	TBD
1336	Vacuum and Gas	I	Installation of the PEPC Foreline Vacuum Pumping System in Laser Bay 1 and Laser Bay 2	Biltoft, Rhodes, Bettenhausen	TBD	TBD
		O	Operation of the PEPC Foreline Vacuum Pumping System for NIF	Biltoft, Rhodes, Bettenhausen	TBD	TBD
		M	Maintenance of the PEPC Foreline Vacuum Pumping System for NIF	Biltoft, Rhodes, Bettenhausen	TBD	TBD
1337	Assembly/Installation/Test/Maintenance Equipment	O	Operation of the PEPC Subsystem Installation and Test Equipment for NIF	Biltoft, Rhodes, Bettenhausen	TBD	TBD
		M	Maintenance of the PEPC Subsystem Installation and Test Equipment for NIF	Biltoft, Rhodes, Bettenhausen	TBD	TBD
134	**Amplifier Power Conditioning System**	Adm	Power Condition System (PCS) Overview	Wilson	11/98	8/99
		O/M	PILC Module Safe Entry and Shorting Procedure	Hammond	11/98	8/99
		O/M	PILC Module Connect/Disconnect Procedure	Hammond	11/98	8/99
		O/M	PILC Module Operation and Checkout Procedure	Hammond	11/98	8/99
1341	Capacitor Assemblies	A/O/M	PCS Capacitor Bank Module Assembly/Disassembly Procedure	Moore	11/98	8/99
		O/M	Safe Entry and Shorting Procedure	Ullery	11/98	8/99
		O/M	Operation and Checkout Procedure	Ullery	11/98	8/99
1342	Switch Assemblies	O	ST-300 Gas Switch Operating Procedure	Moore	11/98	8/99
		M	ST-300 Refurbishment Procedure	Moore	11/98	8/99

WBS No.	System Element	Cate - gory	Title	Technical Expert	Date Writing Begins	Date Req'd
1 3 4 3	Charging System		None	--	--	--
1 3 4 4	Transmission Lines		None	--	--	--
1 3 4 5	Control and Diagnostics	O/M	Current Monitor Calibration	Mowrer	11/98	5/99
		A/O/ M	Control Rack Assembly/ Disassembly Procedure	Downey	11/98	5/99
		O/M	Control Rack Operation and Calibration Procedure	Downey	11/98	5/99
		O/M	Gas System Operating Procedure	Muirhead	11/98	8/99
1 3 4 6	Primary Power		None	--	--	--
1 3 4 7	Assembly/Installation/Test/Maintenance Equipment	O/M	Current Monitor Calibrator	Mowrer	11/98	5/99
		M	High Voltage Test Stand Operating Procedure	Ullery	11/98	5/99
1 3 5	**Laser Auxiliary System**		TBD	TBD	TBD	TBD
1 3 5 1	Water, Gas Systems, Piping	I	Installation of the Laser Auxiliary Systems, Gas	Mukherji, Ng, Reed, Hitchcock	TBD	TBD
		I	Installation of the Laser Auxiliary System, Water	Mukherji, Ng, Reed, Hitchcock	TBD	TBD
		O	Operation of the Laser Auxiliary Systems, Gas	Mukherji, Ng, Reed, Hitchcock	TBD	TBD
		O	Operation of the Laser Auxiliary Systems, Water	Mukherji, Ng, Reed, Hitchcock	TBD	TBD
		M	Maintenance of the Laser Auxiliary System, Gas	Mukherji, Ng, Reed, Hitchcock	TBD	TBD
		M	Maintenance of the Laser Auxiliary System, Water	Mukherji, Ng, Reed, Hitchcock	TBD	TBD
1 3 5 2	Electrical Power	O	TBD	TBD	TBD	TBD
		M	TBD	TBD	TBD	TBD
1 3 6	**Laser Integration**	--	None	--	--	--
1 3 6 1	Project Management and Planning	--	None	--	--	--
1 3 6 2	Reliability/Availability/ Maintainability	--	None	--	--	--
1 3 6 3	Assurances/ES&H	--	None	--	--	--
1 3 6 4	Requirements/Interface Control	--	None	--	--	--
1 3 6 5	System Engineering	--	None	--	--	--
1 4	BEAM TRANSPORT SYSTEMS		TBD	TBD	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
141	**Spatial Filter Vessels/ Enclosures**	--	None	--	--	--
1.4.1.1	Spatial Filter Vacuum Vessels	--	None	--	--	--
1.4.1.2	Switchyard Beam Enclosures	--	None	--	--	--
1413	Laser Bay Beam Enclosures	--	None	--	--	--
1414	Assembly/Installation/Test/Main tenance Equipment	--	None	--	--	--
142	**Auxiliary Subsystems**		TBD	TBD	TBD	TBD
1421	Vacuum Systems	I	Installation of the BTS Vacuum System	Densley, Hitchcock, Karlsen, Churchill, Reed	TBD	TBD
		O	Operation of the BTS Vacuum System	Densley, Hitchcock, Karlsen, Churchill, Reed	TBD	TBD
		M	Maintenance of the BTS Vacuum System	Densley, Hitchcock, Karlsen, Churchill, Reed	TBD	TBD
1422	Not used		--	--	--	--
1423	Not used		--	--	--	--
1424	Gas Handling Systems (Argon)	I	Installation of the BTS Argon System	Mukherji, Hitchcock, Karlsen, Valderama, Reed, Wang	TBD	TBD
		O	Operation of the BTS Argon System	Mukherji, Hitchcock, Karlsen, Valderama, Wang	TBD	TBD
		M	Maintenance of the BTS Argon System	Mukherji, Hitchcock, Karlsen, Valderama, Wang	TBD	TBD
1425	Conventional Utilities (Mechanical)	I	Installation of the NIF Conventional Mechanical Utilities System	Densley, Hitchcock, Churchill, Reed	TBD	TBD
		O	Operation of the NIF Conventional Mechanical Utilities System	Densley, Churchill, Hitchcock	TBD	TBD
		M	Maintenance of the NIF Conventional Mechanical Utilities System	Densley, Churchill, Hitchcock	TBD	TBD
1426	Assembly/Installation/Test/Main tenance Equipment	I	Installation of the NIF Special Equipment	Reed, Hitchcock	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
143	**Support Structures**	--	None	--	--	--
1431	Switchyard Support Structures	--	None	--	--	--
14311	Switchyard Space frame	--	None	--	--	--
14312	Switchyard Diagnostic Structures	--	None	--	--	--
14313	Switchyard Catwalks and Mezzanines	--	None	--	--	--
14314	Assembly/Installation/Test/Maintenance Equipment	--	None	--	--	--
1432	Laser Bay Support Structures	--	None	--	--	--
14321	Vacuum Vessel Support Structures	--	None	--	--	--
14322	Laser Bay Diagnostic Structures	--	None	--	--	--
14323	Periscope Structures	--	None	--	--	--
14324	Amplifier Support Structure	--	None	--	--	--
14325	Not used	--	None	--	--	--
14326	Deformable Mirror Support Structures	--	None	--	--	--
14327	Laser Bay Catwalks and Mezzanines	--	None	--	--	--
14328	Assembly/Installation/Test/Maintenance Equipment	--	None	--	--	--
144	**Optical Mounts**		TBD	TBD	TBD	TBD
1441	Transport Mirror Optical Mounts	A	LM4 (up facing) Assembly Procedure	Chambers	7/98	1/00
		A	LM4 (down facing) Assembly Procedure	Chambers	7/98	1/00
		A	LM5 (up facing) Assembly Procedure	Chambers	10/98	1/00
		A	LM5 (down facing) Assembly Procedure	Chambers	10/98	1/00
		I	LM4 Installation Procedure	Chambers	10/98	4/00
		I	LM5 Installation Procedure	Chambers	10/98	4/00
		A	LM6 Assembly Procedure	Addis	10/98	1/00
		A	LM7 Assembly Procedure	Addis	10/98	1/00
		A	LM8 (up facing) Assembly Procedure	Addis	10/98	1/00
		A	LM8 (down facing) Assembly Procedure	Addis	10/98	1/00
		I	LM6 Installation Procedure	Addis	10/98	4/00
		I	LM7 Installation Procedure	Addis	10/98	4/00

WBS No.	System Element	Cate - gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1 4 4 1	Transport Mirror Optical Mounts (cont.)	I	LM8 Installation Procedure	Addis	10/98	4/00
		A	Shutter/Beam Dump Assembly Procedure	Hamilton	10/98	1/00
		I	Shutter/Beam Dump Installation Procedure	Hamilton	10/98	4/00
1 4 4 2	Cavity Mirror and Periscope Mounts	A	LM1 Assembly Procedure	Harrington	10/98	1/00
		A	LM2 Assembly Procedure	Harrington	10/98	1/00
		I	LM1 Installation Procedure	Harrington	10/98	4/00
		I	LM2 Installation Procedure	Harrington	10/98	4/00
		A	Periscope Assembly Procedure	Hale	10/98	1/00
		I	Periscope Installation Procedure	Hale	10/98	4/00
1 4 4 3	Spatial Filter Optical Hardware	A	SF1/SF2 Assembly Procedure	Hamilton	7/98	1/00
		A	SF3 Assembly Procedure	Hamilton	7/98	1/00
		A	SF4 Assembly Procedure	Hamilton	7/98	1/00
		I	SF1-SF3 Installation Procedure	Hamilton	10/98	4/00
		I	SF4 Installation Procedure	Hamilton	10/98	4/00
		A	M1 Injection Mirror Assembly Procedure	Hamilton	10/98	1/00
		A	Injection Telescope/Mirror Assembly Procedure	Hamilton	10/98	1/00
		I	M1 Injection Mirror Installation Procedure	Hamilton	10/98	4/00
		I	Injection Telescope/Mirror Installation Procedure	Hamilton	10/98	4/00
1 4 4 4	Optical Alignment Hardware		TBD	TBD	TBD	TBD
1 4 5	**Transport Integration**	--	None	--	--	--
1 4 5 1	Project Management and Planning	--	None	--	--	--
1 5	INTEGRATED COMPUTER CONTROL	M	Software Installation	Woodruff	TBD	1st Bundle
1 5 1	**Computer System**	O	Data Array Backup	Schaefer	TBD	TBD
		M	Firewall Check List	Schaefer	TBD	TBD
		M	Intrusion Check	Kurzter	TBD	TBD
1 5 1 1	Software Engineering Computer System		TBD	TBD	TBD	TBD
1 5 1 2	Operations Computer System	M	Weekly Maintenance List	Schaefer	TBD	TBD
		O	Data Achieving Check List	Schaefer	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1512	Operations Computer System (cont.)	O	Booting the NIF Computers	Schaefer	TBD	TBD
		O	Obtaining IP Number	Schaefer	TBD	TBD
		M	Intrusion Check	Kurzter	TBD	TBD
		O	Guest Computer Connection	Schaefer	TBD	TBD
		M	Firewall Check List	Schaefer	TBD	TBD
		O	Installing new ICCS Codes	Schaefer	TBD	TBD
		M	System Operation Check List	Schaefer	TBD	TBD
		M	Backup ICCS	Schaefer	TBD	TBD
		M	Restore ICCS	Schaefer	TBD	TBD
152	**Supervisory Control Software**	O	Starting Integrated Computer Control System	Reynolds	1/00	10/01
		M	Upgrading Integrated Computer Control System	Reynolds	1/00	10/01
		O	Stopping Integrated Computer Control System	Reynolds	1/00	10/01
		O	Stopping an Integrated Computer Control System Subsystem	Reynolds	1/00	10/01
		M	Troubleshooting Integrated Computer Control System	Reynolds	6/00	10/01
		O	Starting a Shot Cycle	Dahlgren	6/00	10/01
		O	Defining an Experiment	Dahlgren	6/00	10/01
		O	Long-Term Shot Data Archiving	Fong	12/00	10/01
		O	Retrieving Past Shot Data	Fong	12/00	10/01
		O	Retrieving Logs	Fong	6/00	10/01
		M	Switching Bank Modules in Integrated Computer Control System	Dahlgren	1/00	10/01
		M	Changing Device Configuration	Saroyan	1/00	10/01
		O	Manual Alignment	Saroyan	4/00	10/01
		O	Defining Quick-look Processing	Saroyan	12/00	10/01
		M	Adding New Target Diagnostics	Saroyan	12/00	10/01
		M	Replacing an FEP	Saroyan	6/00	10/01
1521	System Integration Software		TBD	TBD	TBD	TBD
1522	Alignment Controls Software		TBD	TBD	TBD	TBD
1523	Power Conditioning and Pockels Cell Software		TBD	TBD	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1524	Laser Diagnostics Software		TBD	TBD	TBD	TBD
1525	Target Diagnostics Software		TBD	TBD	TBD	TBD
1526	Master Oscillator and Preamplifier Software		TBD	TBD	TBD	TBD
1527	Shot Director Controls and Status Software		TBD	TBD	TBD	TBD
153	**Integrated Timing System**		TBD	TBD	TBD	TBD
1531	Facility Master Timing	O	Starting the Integrated Timing System - Master FEP	Lagin	1/99	9/99
		O	Starting the Integrated Timing System - Zone FEP	Lagin	1/99	9/99
		O	Starting the Integrated Timing System - Facility Timing	Lagin	1/99	9/99
		O	Performing Synchronization Between ITS and MOR	Wiedwald, Dreifuerst	5/99	5/00
		O	Implementing Alternate Facility Timing	Sewall	8/99	6/00
		O	Management of Timing-dependent Databases	Lagin	4/99	10/99
		O	Incorporating ITS Frameworks within ICCS Supervisory or FEP Applications	Lagin	1/99	3/99
		O	Confirming Database Validity	Lagin	1/00	6/00
		M	Diagnosing and Repairing Facility Timing System Problems	Sewall	2/00	6/00
		M	Verification of ITS Timing Against Fiducial	Sewall	3/00	8/00
		M	Replacing a Master FEP	Lagin	1/00	6/00
		M	Replacing a DIO Module	Lagin	2/00	6/00
		M	Replacing a Time Frame Generator Module	Lagin	2/00	6/00
		M	Configuring and Diagnosing Network Triggers	Lagin	2/00	6/00
		I	Upgrading FEP Software - Master	Lagin	7/99	1/00
		I	Upgrading FEP Software - Zone	Lagin	7/99	1/00
		T	Training Procedures to be Integrated into ICCS	TBD	TBD	TBD
1532	Local Timing Distribution	O	Operation of Signal Simulation of the ITS	Wiedwald	1/00	6/00
		O	Timing of Diagnostic Instruments (20 each or 4 generic))	Various	10/99 to 12/00	5/00 to 5/01
		O	Setting Delay Channel Parameters	Lagin	3/99	1/00
		O	Reading Delay Channel Parameters	Lagin	3/99	1/00
		O	Performing Trigger Diagnostic Measurements	Lagin	3/99	1/00
		M	Diagnosing Failure of Client to Receive a Trigger	TBD	1/00	6/00

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1532	Local Timing Distribution (cont)	I	Replacing a Delay Generator Module	TBD	2/00	6/00
		I	Replacing a Trigger Fanout	TBD	4/00	8/00
		I	Replacing a VME Crate	TBD	2/00	6/00
		M	Confirmation of Client Timing	TBD	3/00	7/00 to 7/01
		I	Replacing a Time Interval Meter	TBD	2/00	6/00
		I	Replacing a Local Timing Embedded Processor	TBD	4/00	TBD
		T	Training Procedures to be Integrated into ICCS	TBD	TBD	TBD
1533	Integrated Timing Fiducial Beam	O	Optical Fiducial Alignment	Lerche	12/99	5/00
		O	Optical Fiducial Timing Confirmation	Lerche	2/00	8/00
		M	Diagnosing Failure of Client to Receive a Fiducial	Lerche	3/00	10/00
		I	Adding Fiducial Channels	Lerche	6/00	1/01
		T	Operational and Maintenance Training Procedures for Fiducial System	Lerche	2/00	9/00
1533	Integrated Timing Fiducial Beam (cont.)	T	General Training Procedures to be Integrated into ICCS	TBD	TBD	TBD
154	**Integrated Safety Systems**	T	NIF Integrated Safety System Overview	Reed	~5/99	By 1st Bundle
1541	Safety Interlocks	O/T	NIF Safety Interlock System Operating Procedure	Reed	~5/99	By 1st Bundle
		I	NIF Safety Interlock System Installation Procedure	Reed	~11/98	3/00
		M	NIF Safety Interlock System Test Procedure	Reed	~5/99	9/03
		M	NIF Safety Interlock System Troubleshooting and Maintenance Procedure	Reed	9/01	9/03
		M	Safety Interlock system Code Release Procedure	Reed	~9/99	By 1st Bundle
		M	Safety Interlock System Code Release Procedure	Reed	~11/99	~8/00 through 9/03
154.2	Access Controls	O	NIF Access Control System Operating Procedure	Reed	~10 99	9/03
		M	NIF Access Control System Maintenance and Test Procedure	Reed/ Contractor	9/01	9/03
1543	T-1 Abort System	O	NIF T-1 Abort System Operating Procedure	Reed	9/00	9/03
		M	NIF T-1 Abort System Maintenance and Test Procedure	Reed	~10/99	9/03
155	**Automatic Alignment System**	M	FEP Software Maintenance	Miller	TBD	TBD
		M	FEP Hardware Maintenance	Miller	TBD	TBD
		M	Actuator control Translator Maintenance	Miller	TBD	TBD

WBS No	System Element	Cate - gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1 5 5 1	Automatic Alignment Front-End Processors		TBD	TBD	TBD	TBD
1 5 5 2	Front-End Processor Software		TBD	TBD	TBD	TBD
1 5 6	**Ancillary Systems**	M	Industrial Controls FEP Software Maintenance	Larkin	9/01	9/03
		M	Industrial Controls FEP Software Operations Manual	Larkin	9/01	9/03
1 5 6 1	Television Distribution		TBD	TBD	TBD	TBD
1 5 6 2	Communications	O	NIF Communications System Operating Procedure	Reed	11/01	9/03
		M	NIF Communications System Test Procedure	Reed	~10/99	9/03
1 5 6 3	Facility Environment Monitor	O	NIF Facility Environmental Monitoring System Operating Procedure	Reed	10/00	1/02
		M	NIF Facility Environmental Monitoring System Maintenance and Test Procedure	Reed	~10/99	9/03
1 5 7	**Integrated Computer Control Integration**	--	None	--	--	--
1 5 7 1	Project Management and Planning	--	None	--	--	--
1 5 7 2	Reliability/Availability/ Maintainability	--	None	--	--	--
1 5 7 3	Assurances/ES&H	--	None	--	--	--
1 5 7 4	Requirements/Interface Control	--	None	--	--	--
1 5 7 5	System Engineering	--	None	--	--	--
1 6	OPTICAL COMPONENTS	--	None	--	--	--
1 6 1	**Amplifier Slabs**	--	None	--	--	--
1 6 1 1	Cavity Amplifier Slabs	--	None	--	--	--
1 6 1 2	Booster Amplifier Slabs	--	None	--	--	--
1 6 1 3	Amplifier Slabs Integration	--	None	--	--	--
1 6 2	**Lenses**	--	None	--	--	--
1 6 2 1	Cavity Spatial Filter	--	None	--	--	--
1 6 2 2	Transport Spatial Filter	--	None	--	--	--
1 6 2 3	Final Focus	--	None	--	--	--
1 6 2 4	Lenses Integration	--	None	--	--	--
1 6 3	**Mirrors**	--	None	--	--	--
1 6 3 1	Cavity Mirrors	--	None	--	--	--

WBS No.	System Element	Cate - gory	Title	Technical Expert	Date Writing Begins	Date Req'd
1 6 3 2	Optical Switch Mirrors	--	None	--	--	--
1 6 3 3	Beam Transport Mirrors	--	None	--	--	--
1 6 3 4	Mirror Integration	--	None	--	--	--
1 6 4	**Polarizers**	--	None	--	--	--
1 6 4 1	Optical Switch	--	None	--	--	--
1 6 4 2	Optical Switch Integration	--	None	--	--	--
1 6.5	**KDP and KD*P Crystals**	--	None	--	--	--
1 6 5 1	Optical Switch	--	None	--	--	--
1 6 5 2	Second Harmonic Generation	--	None	--	--	--
1 6 5 3	Third Harmonic Generation	--	None	--	--	--
1 6 5 4	Crystals Integration	--	None	--	--	--
1 6 6	**Debris Shields and Windows**	--	None	--	--	--
1 6 6 1	Debris Shields	--	None	--	--	--
1 6 6 2	Not used	--	None	--	--	--
1.6 6 3	Optical Switch Windows	--	None	--	--	--
1 6 6 4	Not used	--	None	--	--	--
1 6 6 5	Target Chamber Vacuum Window	--	None	--	--	--
1 6 6 6	Diffractive Optics Plate	--	None	--	--	--
1 6 6 7	Debris Shields, Windows, and Diffractive Optics Integration	--	None	--	--	--
1 6 7	**Pulse Generation Optics**	--	None	--	--	--
1 6 7 1	Pulse Generator Optics	--	None	--	--	--
1 6 7 2	Pulse Generator Integration	--	None	--	--	--
1 6 8	**Optical Component Processing**	O	Laundry	TBD	TBD	TBD
		O	Cleanliness Control (including Protocol)	TBD	TBD	TBD
		M	Clean Room Maintenance	TBD	TBD	TBD
1 6 8 1	Optical Component Tracking, Inventory, and Process Control	O	Vendor QC Documentation	TBD	TBD	TBD
		O	Vendor Data Storage	TBD	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1681	Optical Component Tracking, Inventory, and Process Control (cont.)	O	Receiving Inventory Process	TBD	TBD	TBD
		O	Material Handling	TBD	TBD	TBD
		O	Storage	TBD	TBD	TBD
		O	Bar-coding	TBD	TBD	TBD
1.6.8.2	Optical Component Cleaning	O	KDP/KD*P Cleaning	TBD	TBD	TBD
		O	Fused Silica Cleaning	TBD	TBD	TBD
		O	Laser Glass Cleaning	TBD	TBD	TBD
		O	Dielectrics Cleaning	TBD	TBD	TBD
		O	Blast Shields Cleaning	TBD	TBD	TBD
		O	Pre-Cleaning	TBD	TBD	TBD
		O	Cleanliness Validation	TBD	TBD	TBD
		O	Damage Test	TBD	TBD	TBD
		O	Bacteria (H_2O) Test	TBD	TBD	TBD
		O	Resistivity Test	TBD	TBD	TBD
		O	pH Test	TBD	TBD	TBD
		O	Surfactant Test	TBD	TBD	TBD
		O	Filtration	TBD	TBD	TBD
		O	Waste Material Handling	TBD	TBD	TBD
		O	Optics Handling	TBD	TBD	TBD
		O	Mechanical Cleaning - Fixtures	TBD	TBD	TBD
		O	Mechanical Cleaning - Shipping Carts	TBD	TBD	TBD
		O	Mechanical Cleaning - Cleanliness Validation	TBD	TBD	TBD
		M	KDP Cleaning System Maintenance	TBD	TBD	TBD
		M	Fused Silica Cleaning System Maintenance	TBD	TBD	TBD
1683	Sol Gel Coating	O	Sol Gel Production - Fused Silica	TBD	TBD	TBD
		O	Sol Gel Production - KDP/KD*P	TBD	TBD	TBD
		O	Coating Fused Silica	TBD	TBD	TBD
		O	Coating KDP/KD*P	TBD	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1683	Sol Gel Coating (cont)	O	Coating Spin Rates	TBD	TBD	TBD
		O	Coating Draw Rates	TBD	TBD	TBD
		O	Silicone Coating	TBD	TBD	TBD
		O	Silicone Oven Cure	TBD	TBD	TBD
		O	Coating Damage Test	TBD	TBD	TBD
		O	Coating Material Test	TBD	TBD	TBD
		O	Coating Chemical Analysis	TBD	TBD	TBD
		O	Inspections	TBD	TBD	TBD
1684	Optical Component Assembly/Packaging/ Handling Systems	A	Amplifier/FAU Assembly	TBD	TBD	TBD
		A	FOA Assembly	TBD	TBD	TBD
		A	Pockels Cell Assembly	TBD	TBD	TBD
		A	Mirror/Polarizer Assembly	TBD	TBD	TBD
		A	Spatial Filter Assembly	TBD	TBD	TBD
		A	FOA Alignment	TBD	TBD	TBD
		A	Spatial Filter Alignment	TBD	TBD	TBD
		A	Mirror/Polarizer Alignment	TBD	TBD	TBD
		A	Interferometry - Amplifiers	TBD	TBD	TBD
		A	Interferometry - Mirrors	TBD	TBD	TBD
		A	Interferometry - KDP Cell	TBD	TBD	TBD
		A	Interferometry - Polarizer	TBD	TBD	TBD
		A	Cleanliness Validation	TBD	TBD	TBD
		O	Transportation	TBD	TBD	TBD
		O	Clean Fork Truck Operations	TBD	TBD	TBD
		O	Jib Crane	TBD	TBD	TBD
		O	Fixtures	TBD	TBD	TBD
		O	Load Testing	TBD	TBD	TBD
		O	Cleanliness Control	TBD	TBD	TBD
		O	Vibration Analysis	TBD	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1684	Optical Component Assembly/Packaging/ Handling Systems (cont.)	M	Material Handling - Maintenance	TBD	TBD	TBD
1685	Optical Component Processing Integration		TBD	TBD	TBD	TBD
169	**QA and Damage Testing**	O	Interferometry	TBD	TBD	TBD
		O	Photometry	TBD	TBD	TBD
		O	COMS	TBD	TBD	TBD
		O	Damage Testing	TBD	TBD	TBD
		O	Clean Room Cleanliness Control	TBD	TBD	TBD
		M	Clean Room Maintenance	TBD	TBD	TBD
		O	Optic Inspection	TBD	TBD	TBD
		O	KDP Inspection	TBD	TBD	TBD
		O	QIII Surface Particle Counts	TBD	TBD	TBD
		O	Airborne Particle Counts	TBD	TBD	TBD
		O	Witness Plate Counts	TBD	TBD	TBD
		O	Tape Testing	TBD	TBD	TBD
		O	NVR Testing	TBD	TBD	TBD
		O	VOC Testing	TBD	TBD	TBD
		O	Spectrophotometer	TBD	TBD	TBD
		O	Data Management	TBD	TBD	TBD
		M	Facility Maintenance	TBD	TBD	TBD
1691	Metrology Systems		TBD	TBD	TBD	TBD
1692	Metrology Integration		TBD	TBD	TBD	TBD
1610	**Optical Component Integration**		TBD	TBD	TBD	TBD
16101	Optical Design Integration		TBD	TBD	TBD	TBD
16102	Optical Production Integration		TBD	TBD	TBD	TBD
17	LASER CONTROLS		TBD	TBD	TBD	TBD
171	**Alignment Systems**		TBD	TBD	TBD	TBD
1711	Pulse Generator Alignment	O	Installation Procedure for Pulse Generator	TBD	TBD	TBD
			Operating Procedure for Pulse Generator Alignment	TBD	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1712	Main Laser Alignment	O	Installation Procedure for Main Laser	TBD	TBD	TBD
			Operating Procedure for Main Laser Alignment			
1713	Target Area Alignment	O	Operating Procedure for Target Area Alignment	TBD	TBD	TBD
1714	Alignment Control	O	Alignment Control Procedure	TBD	TBD	TBD
172	**Beam Diagnostics**		TBD	TBD	TBD	TBD
1721	Not Used		TBD	TBD	TBD	TBD
1722	Main Laser Diagnostics		TBD	TBD	TBD	TBD
1723	Target Area Diagnostics		TBD	TBD	TBD	TBD
17231	Unknown		TBD	TBD	TBD	TBD
1.7.2.3.2	Precision Diagnostics Station	M	Mirror LRU Installation and Removal	Knopp	TBD	6/1/00
		O	Vacuum System Operations	Knopp	TBD	6/1/00
		I/O	Alignment Laser Initial Alignment	Thompson	TBD	9/1/00
		I	Initial Alignment of Transport and Trombone	Knopp	TBD	6/1/00
		O	Target Plane Diagnostic Alignment	Thompson	TBD	9/1/00
17232	Precision Diagnostics Station (cont.)	O	Assembly and Alignment of PM4 and PM5	Knopp	TBD	6/1/00
		O	Safety Operating Procedure for Alignment Laser	Thompson	TBD	9/1/00
		M/I	Cleaning of Argon Enclosure	Knopp	TBD	6/1/00
		O	Diagnostic Data Acquisition System Operations	Demaret	TBD	11/1/00
17233	Unknown		TBD	TBD	TBD	TBD
17234	Laser Optic Damage Inspection	O	System Alignment	Thompson	TBD	11/1/00
1724	Energy Diagnostics Data System		TBD	TBD	TBD	TBD
1725	Power Diagnostics Data System		TBD	TBD	TBD	TBD
1726	Not Used		TBD	TBD	TBD	TBD
1727	Roving Mirror and Diagnostics Positioning System		TBD	TBD	TBD	TBD
173	**Wave Front Control Systems**	O/M	Adjustment/Validation of Magnification of Beam to HS	Zacharias, Van Atta, Winters, Feldman, Skulina, Knopp, Richardson	FY99	FY00

WBS No.	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
173	**Wave Front Control Systems (cont)**	O/M	Align HS Beams	Zacharias, Van Atta, Winters, Feldman, Skulina, Knopp, Richardson	FY99	FY00
		O/M	Adjustment of Separation of Two Beams to HS	Zacharias, Van Atta, Winters, Feldman, Skulina, Knopp, Richardson	FY99	FY00
		O/M	Rotation of HS	Zacharias, Van Atta, Winters, Feldman, Skulina, Knopp, Richardson	FY99	FY00
		O/M	Wave Front Reference Alignment (x, y, and z) and Positioning	Zacharias, Van Atta, Winters, Feldman, Skulina, Knopp, Richardson	FY99	FY00
173	**Wave Front Control Systems (cont.)**	O/M	DM Operation to a Previously-Measured Flat (Open Loop) Condition	Van Atta, Zacharias	FY99	FY00
		O/M	Check Wave Front Video Processor Spot Acquisition and Threshold Adjust	Van Atta, Zacharias	FY99	FY00
		O/M	Check for Proper Acquisition of HS Set Point (Image of Pass-4 Fiber)	Van Atta, Zacharias	FY99	FY00
		O/M	Check for Proper Gain Matrix Calibration	Van Atta, Zacharias	FY99	FY00
		O	Acquisition of HS Image of Pass-4 Fiber Gain Matrix Calibration	Van Atta, Zacharias	FY99	FY00
		O	Closed Loop Operations	Van Atta, Zacharias	FY99	FY00
		O	Operation - Acquisition of Shot Wave Front	Van Wonterghem, Zacharias, Van Atta, Saroyan	FY99	FY00
		O	Storage and Use of Shot Wave Front as Pump Pre-correction File	Van Wonterghem, Zacharias, Van Atta, Saroyan	FY99	FY00
		O	Operating Modes, Holds, and Aborts	Van Wonterghem, Zacharias, Van Atta, Saroyan	FY99	FY00

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
173	**Wave Front Control Systems (cont.)**	O/M	Measurement of Static Switchyard/Final Optics Aberrations	Van Atta, Zacharias	FY99	FY00
		I/M	T-1 Interface Checkout	Reed, Saroyan, Van Atta	FY99	FY00
1731	Adaptive Optics	I/M	DM Installation and Alignment into LRU	Richardson, Winters	FY99	FY00
		I/M	DM LRU Installation and Alignment	T&H Group, Richardson, Winters	FY99	FY00
		I/M	DM Cleaning	Wong, Winters	FY99	FY00
1732	Wave Front Measurement	I/M	Wave Front Reference Installation and Alignment	Feldman	FY99	FY00
		I/M	Hartmann Sensor Installation and Alignment	Toeppen, Zacharias	FY99	FY00
1733	Wave Front Control Systems	I/M	WC Installation	Van Atta	FY99	FY00
174	**Laser Control Integration**		TBD	TBD	TBD	TBD
1741	Project Management and Planning		TBD	TBD	TBD	TBD
1742	Reliability/Availability/ Maintainability		TBD	TBD	TBD	TBD
1743	Assurances/ES&H		TBD	TBD	TBD	TBD
1744	Requirements/Interface Control		TBD	TBD	TBD	TBD
1745	System Engineering		TBD	TBD	TBD	TBD
18	TARGET EXPERIMENTAL SYSTEM		TBD	TBD	TBD	TBD
181	**Target Chamber**		TBD	TBD	TBD	TBD
1811	Vacuum Chamber		TBD	TBD	TBD	TBD
1812	First Wall	A/M/I	Removal and Installation of Target Chamber First Wall Panels	Hibbard	TBD	TBD
		O/M	Inspection and Maintenance of Laser Beam Dumps	Hibbard	TBD	TBD
1813	Neutron/Gamma Ray Shielding		TBD	TBD	TBD	TBD
1814	Mechanical Structure		TBD	TBD	TBD	TBD
1815	Vacuum System	I/M	Removal and Installation of Target Chamber Cryogenic Vacuum Pumps	Weed	9/99	6/00
		I/M	Removal and Installation of Target Chamber Cryogenic Vacuum Pump Gate Valves	Weed	9/99	6/00
		M	Replacement of Target Chamber Cryogenic Pump Cold Head Sub-assembly	Weed	6/00	4/01
		M	Maintenance of Target Chamber Cryogenic Vacuum Pump Compressors	Weed	6/00	4/01

	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1815	Vacuum System	M	Maintenance of Target Chamber Rough Vacuum Pumps	Weed	6/00	4/01
		O/T	Target Chamber Vacuum System Operating Procedures	Weed	6/00	4/01
		M	Maintenance of Target Chamber Vacuum System Controls	Weed, Reed	6/00	4/01
182	**Target Positioning**	O	Gauging of Target Assemblies Prior to Mounting on Positioner	Pittenger, Johannes	TBD	TBD
		O	Mounting and De-mounting of Target Assemblies on Positioner	Pittenger, Johannes	TBD	TBD
		O	Mounting and De-mounting of Target Alignment Sensor on Positioner	Pittenger, Johannes	TBD	TBD
		A/M/I	Assembly and Disassembly of Target (and TAS) Positioner Booms, Vacuum Housings and Lead Screws	Pittenger, Johannes	TBD	TBD
1821	Inserter/Positioner		TBD	TBD	TBD	TBD
1822	Vacuum Chamber		TBD	TBD	TBD	TBD
1823	Structural Support		TBD	TBD	TBD	TBD
1824	Control System		TBD	TBD	TBD	TBD
1825	Target Positioning Integration		TBD	TBD	TBD	TBD
183	**Target Diagnostics**		TBD	TBD	TBD	TBD
1831	Laser System Performance and Verification Diagnostics		TBD	TBD	TBD	TBD
18311	Time Resolved X-ray Imaging System (TRXI)	O	Time Resolved X-ray Imaging System Operating Procedures	TBD	TBD	TBD
18312	X-ray Streaked Slit Camera (XSSC)	O	X-ray Streaked Slit Camera Operating Procedures	TBD	TBD	TBD
18313	Static X-ray Imaging System (SXI)	O	Static X-ray Imaging System Operating Procedures	TBD	TBD	TBD
1832	Diagnostic Instrument Manipulator	O	Diagnostic Instrument Manipulator Operating Procedure	TBD	TBD	TBD
1833	Target Area Data Acquisition System	O	Dry Run Operations Setup	TBD	TBD	TBD
		O	Shot Operations Setup	TBD	TBD	TBD
		O	Operations Procedure for Each Type of Recording Instrument	TBD	TBD	TBD
		O	Cable Compensation Setup (hardware and software)	TBD	TBD	TBD
18331	Unclassified Target Area Data Acquisition System	O	Unclassified Target Area Data Acquisition System Operating Procedure	TBD	TBD	TBD
18332	Classified Target Area Data Acquisition System	O	Classified Target Area Data Acquisition System Operating Procedure	TBD	TBD	TBD
18333	Classified Control Room- Main	O	Classified Control Room Operating Procedure	TBD	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1834	Target Area Integrated command and Control System	O	Local Control/Automated Control Change-over Procedure	TBD	TBD	TBD
		O	Diagnostic Control Lockout from Automated Control	TBD	TBD	TBD
1835	Timing and Fiducial Systems	O	Calibrating Timing System Procedure	TBD	TBD	TBD
		O	Shot Operating Procedure	TBD	TBD	TBD
1836	EMI/EMP and Radiation Protection	O	EMI/EMP and Radiation Protection Operation and Setup Procedures	TBD	TBD	TBD
1837	Diagnostic Vacuum System	O	Diagnostic Vacuum System Operating Procedures	TBD	TBD	TBD
184	**Target Area Structures**	--	None	--	--	--
1841	Turning Mirror Support Structures	--	None	--	--	--
1842	Catwalks and Platforms	--	None	--	--	--
1843	Beam Tubes	--	None	--	--	--
1844	Neutron/Gamma Ray Shield Support	--	None	--	--	--
1845	Structural Systems Integration	--	None	--	--	--
185	**Environmental Protection Systems**		TBD	TBD	TBD	TBD
1851	Tritium Process Systems		TBD	TBD	TBD	TBD
1852	Debris Shield Decontamination		TBD	TBD	TBD	TBD
1853	Target Chamber Decontamination		TBD	TBD	TBD	TBD
1854	General Decontamination		TBD	TBD	TBD	TBD
1855	Neutron and Gamma Ray Monitoring and Auxiliary Shielding		TBD	TBD	TBD	TBD
1856	Waste Management Systems		TBD	TBD	TBD	TBD
1857	Tritium Monitoring and Contamination Control		TBD	TBD	TBD	TBD
1858	Target Receiving, Storage, and Handling		TBD	TBD	TBD	TBD
186	**Target Area Auxiliary Systems**		TBD	TBD	TBD	TBD
1861	Local Utility Services		TBD	TBD	TBD	TBD
1862	Cable Trays		TBD	TBD	TBD	TBD
1863	Personnel, Safety, and Occupational Access		TBD	TBD	TBD	TBD
1864	Assembly/Installation/ Maintenance Equipment		TBD	TBD	TBD	TBD
18641	Target Chamber Service System		TBD	TBD	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
18642	Target Bay Service System		TBD	TBD	TBD	TBD
187	**Final Optics Assembly**		TBD	TBD	TBD	TBD
1871	Frequency Conversion Assembly	A	FOC Assembly	Hibbard	TBD	TBD
		O	CAVE Operating Procedure	Hibbard	TBD	TBD
		O	Thermal Control System Operating Procedure	Adams	TBD	TBD
		M	Thermal Control System Maintenance	Adams	TBD	TBD
1872	Final Focus Lens Assembly	A	Actuation System Assembly	Hussung	TBD	TBD
		A	Integrated Optics Module Assembly	Hussung	TBD	TBD
		A	Vacuum Window Assembly	Adams	TBD	TBD
1873	Structural Support		TBD	TBD	TBD	TBD
1874	Debris Shields	A	Debris Shield/DOP Assembly	Hall	TBD	TBD
		I	Debris Shield/DOP Removal/ Replacement	Hall	TBD	TBD
1875	Laser Diagnostics	M	3ω Calorimeter Detector Maintenance	Adams	TBD	TBD
1876	FOA Controls	O	Actuation System Operations	Hussung	TBD	TBD
		O	Vacuum/Venting Procedure	Weed	TBD	TBD
1877	FOA Integration	M	Venting/Evacuation System Maintenance	Weed	TBD	TBD
		M	Vacuum Isolation Valve Maintenance	Adams	TBD	TBD
		I	Integrated Optics Module Removal Replacement	Hussung	TBD	TBD
		T	Clean Room Operations for FOA Component Assembly	Adams	TBD	TBD
		T	Safe Handling of Contaminated FOA LRUs	TDB	TBD	TBD
		T	Safe Handling of FOA LRUs	TBD	TBD	TBD
188	**Target Area Integration**	--	None	--	--	--
1881	Project Management and Planning	--	None	--	--	--
19	OPERATIONS SPECIAL EQUIPMENT		TBD	TBD	TBD	TBD
191	**Operations Requirements and Material Flow**		TBD	TBD	TBD	TBD
192	**Optical Transport and Material Handling**	O/M	Laser Bay Transporter Operation and Maintenance	Tiszauer		
1921	Laser Bay Loading		TBD	TBD	TBD	TBD
19211	Bottom Loading	A	Bottom Loading Universal Canister Assembly	Bahowick	TBD	TBD

WBS No	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
19211	Bottom Loading (cont.)	O/M	Bottom Loading Universal Canister Operation and Maintenance	Bahowick	TBD	TBD
		A	Bottom Loading Flashlamp Canister Assembly	Bahowick	TBD	TBD
		O/M	Bottom Loading Flashlamp Canister Operations and Maintenance	Bahowick	TBD	TBD
		A	Bottom Loading Amplifier Slab Canister Assembly	Bahowick	TBD	TBD
		O/M	Bottom Loading Amplifier Slab Canister Operations and Maintenance	Bahowick	TBD	TBD
		A	Compliance System Assembly	Bahowick	TBD	TBD
		I/O	LM1 Installation	Bahowick	TBD	TBD
		I/O	Spatial Filter Lens Installation	Bahowick	TBD	TBD
		I/O	PEPC Installation	Bahowick	TBD	TBD
		I/O	Periscope Installation	Bahowick	TBD	TBD
		I/O	LM2 Installation	Bahowick	TBD	TBD
		I/O	Flashlamp Installation	Bahowick	TBD	TBD
		I/O	Amplifier Slab Installation	Bahowick	TBD	TBD
19212	Top Loading	A	Top Loading Canister Assembly	Rowe	TBD	TBD
		O/M	Top Loading Canister Operation and Maintenance	Rowe	TBD	TBD
		I/O	Spatial Filter Tower Installation	Rowe	TBD	TBD
19213	Side Loading	A	Side Loading Skid Assembly	Rowe	TBD	TBD
		O/M	Side Loading Skid Operation and Maintenance	Rowe	TBD	TBD
		I/O	PAM and Input Sensor Installation	Rowe	TBD	TBD
		O/M	Output Sensor Transporter Operation and Maintenance	Rowe	TBD	TBD
		I/O	Output Sensor Installation	Rowe	TBD	TBD
1922	Switchyard Loading	A	Switchyard Delivery System Assembly	Horton	TBD	TBD
		O/M	Switchyard Delivery System Operation and Maintenance	Horton	TBD	TBD
		I/O	Up-facing LM4 Installation	Horton	TBD	TBD
		I/O	Down-facing LM4 Installation	Horton	TBD	TBD
		I/O	Up-facing LM5 Installation	Horton	TBD	TBD
		I/O	Down-facing LM5 Installation	Horton	TBD	TBD

WBS No.	System Element	Cate-gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
1922	Switchyard Loading (cont)	I/O	Roving Mirrors Installation	Horton	TBD	TBD
		I/O	Precision Optics Installation	Horton	TBD	TBD
		I/O	Beam Shutters Installation	Horton	TBD	TBD
1923	Target Area Loading	A	Target Area Delivery System Assembly	Horton	TBD	TBD
		O/M	Target Area Delivery System Operation and Maintenance	Horton	TBD	TBD
		I/O	!OM Transportation	Horton	TBD	TBD
		I/O	Debris Shield Transportation	Horton	TBD	TBD
		I/O	LM6 Transportation	Horton	TBD	TBD
		I/O	LM7 Transportation	Horton	TBD	TBD
		I/O	LM8 Transportation	Horton	TBD	TBD
1924	Support Vehicles	O/M	Support Vehicles Operations and Maintenance	Yakuma	TBD	TBD
1925	Assembly/Installation/Test/Maintenance Equipment		TBD	TBD	TBD	TBD
193	**Optical Assembly and Alignment Systems**	--	--	--	--	--
1931	Mechanical Cleaning	O	Mechanical Precision Small Parts Cleaner	Wong	TBD	3/00
		O	Mechanical Precision Large Parts Cleaner	Wong	TBD	3/00
		O	CO_2/High Pressure Spray	Wong	TBD	3/00
		O	Disassembly Station	Wong	TBD	3/00
		M	Mechanical Precision Small Parts Cleaner	Wong	TBD	3/00
		M	Mechanical Precision Large Parts Cleaner	Wong	TBD	3/00
		M	CO_2/High Pressure Spray	Wong	TBD	3/00
1932	Material Handling	O	Loading Dock	Wong	TBD	3/00
		A	Clean Room Protocol	Jain	TBD	3/00
		O	Subassembly and Component Fixtures	Simmons	TBD	3/00
19321	Optic Transfer	A	Optic Receiving	Wong	TBD	3/00
19322	Mechanical Transfer	A	Mechanical Receiving	Wong	TBD	3/00
		O	Mechanical Gross Small Parts Cleaner	Wong	TBD	3/00
		O	Mechanical Gross Large Parts Cleaner	Wong	TBD	3/00
		M	Mechanical Gross Small Parts Cleaner	Wong	TBD	3/00

WBS No.	System Element	Cate - gory	Title	Technical Expert	Date Writing Begins	Date Req'd.
19322	Mechanical Transfer (cont)	M	Mechanical Gross Large Parts Cleaner	Wong	TBD	3/00
19323	LRU Transfer	A	Basement Loading	Simmons	TBD	3/00
		A	Loft Loading	Simmons	TBD	3/00
		A	OAB Transporter	Perez	TBD	3/00
		M	Vertical Lift	Simmons	TBD	3/00
		M	Airlock Lift	Simmons	TBD	3/00
		O	Vertical Lift	Simmons	TBD	3/00
		O	Airlock Lift	Simmons	TBD	3/00
		O	SF Tower Cart	Yoeman	TBD	3/00
19324	Subassembly Handling Systems		TBD	TBD	TBD	TBD
1933	Assembly, Disassembly, and Alignment	A	Optics Insertion Mechanism Operation	Simmons	TBD	3/00
		M	Optics Insertion Mechanism Maintenance	Simmons	TBD	3/00
		A	Rotating Assembly Table Operation	Simmons	TBD	3/00
		M	Rotating Assembly Table Maintenance	Simmons	TBD	3/00
19331	Amplifiers		TBD	TBD	TBD	TBD
19332	Mirrors and Polarizers		TBD	TBD	TBD	TBD
19333	FOA		TBD	TBD	TBD	TBD
19334	Spatial Filters		TBD	TBD	TBD	TBD
19335	Pockels Cells		TBD	TBD	TBD	TBD
1934	Measurement and Inspection	--	--	--	--	--
19341	Interferometry	O	Surface Mapper	Schmitt	TBD	7/00
		M	Surface Mapper	Schmitt	TBD	7/00
19342	Photometry	O	Photometry	Schmitt	TBD	7/00
		M	Photometry	Schmitt	TBD	7/00
19343	Cleanliness Verification	O	Cleanliness Verification	Schmitt	TBD	7/00
		M	Cleanliness Verification	Schmitt	TBD	7/00
1935	Assembly/Installation/Test/Maintenance Equipment		TBD	TBD	TBD	TBD
194	**Operations Special Equipment**		TBD	TBD	TBD	TBD

WBS No.	System Element	Cate - gory	Title	Technical Expert	Date Writing Begins	Date Req'd
1 9 4 1	Project Management and Planning		TBD	TBD	TBD	TBD
1 9 4 2	Reliability/Availability/ Maintainability		TBD	TBD	TBD	TBD
1 9 4 3	Assurances/ES&H		TBD	TBD	TBD	TBD
1 9 4 4	Requirements/Interface Control		TBD	TBD	TBD	TBD
1 9 4 5	System Engineering		TBD	TBD	TBD	TBD
1 10	STARTUP ACTIVITIES	--	None	--	--	--
1 10 1	**Site Coordination and Planning**	--	None	--	--	--
1 10 1 1	Operability and Maintainability Reviews	--	None	--	--	--
1 10 1 2	Advanced Planning	--	None	--	--	--
1 10 2	**Startup Planning Integration**	--	None	--	--	--
1 10 2 1	Project Management and Planning	--	None	--	--	--
1 10 2 2	Reliability/Availability/ Maintainability	--	None	--	--	--
1 10 2 3	Assurances/ES&H	--	None	--	--	--
1 10 2 4	Requirements/Interface Control	--	None	--	--	--
1 10 2 5	System Engineering	--	None	--	--	--
1 10 3	**Operational Readiness Review**	--	None	--	--	--
1 10 4	**Startup and Operational Testing**	--	None	--	--	--
1 10 4 1	Production Bundle	--	None	--	--	--
1 10 4 2	Cluster 1	--	None	--	--	--

Legend:

A	Assembly	TBD	To be determined
I	Installation	None	No procedures required at this time
M	Maintenance		
O	Operating		
T	Training		

APPENDIX D:

LIST OF NOVA PROCEDURES

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LIST OF NOVA PROCEDURES

Procedure Title	Area	Category
Sweep System and Procedure	Bldg 391	Maintenance and repair
Safing Procedure for Rod Amplifiers	Bldg 391	Operating
Laser Diagnostic Spool and Laser Beamline Access	Bldg 391	Operating
Low-level Waste Handling and Packaging	Bldg 391	Maintenance and repair
Ion Pump Procedure	Bldg 391	Operating
Procedure for Opening N2-filled Beam Tubes and Pipes	Bldg 391	Operating
Target Chamber Access, Securing, and Entry Procedures	Bldg 391	Operating
Power-Conditioning Substation and Safety Procedures	Bldg 391	Operating
Gastech Model OX-82 Oxygen Monitor	Bldg 391	Operating
Procedure for Handling Parts that are Potentially Contaminated with Tritium	Bldg 391	Operating
Procedure for Regenerating Target Chamber Cryo Pumps	Bldg 391	Operating
Bicron 505 Spill Procedure	Bldg 391	Operating
Pre-Lift Inspection Checklist for Manbasket	Bldg 391	Operating
Amplifier Installation and Removal Checklists	B391, Clean Rm	Maintenance and repair
Disk Cleaning and Inspection	B391, Clean Rm	Maintenance and repair
Flashlamp Test Procedure	B391, Clean Rm	Operating
Turning Mirror Assembly	B391, Clean Rm	Assembly/disassembly
Polarizer and Splitter Assembly	B391, Clean Rm	Assembly/disassembly
Polarizer and Splitter Disassembly	B391, Clean Rm	Assembly/disassembly
Faraday Rotators	B391, Clean Rm	Operating
Amplifier Assembly	B391, Clean Rm	Assembly/disassembly
KDP Cleaning and Inspection	B391, Clean Rm	Assembly/disassembly
Debris Shield Removal/Installation Checklist	B391, Clean Rm	Maintenance and repair
Focus Lens Removal/Installation Checklist	B391, Clean Rm	Maintenance and repair
Sol-gel Coating (AR Dip Coating)	B391, Clean Rm	Assembly/disassembly
Monthly Chamber Cleaning Procedure	B391, Clean Rm	Maintenance and repair
AAP Operation Procedure	B391, Clean Rm	Operating
Lens Positioner	B391, Clean Rm	Operating
Center Mirror Spool	B391, Clean Rm	Operating
Operating	B391, Clean Rm	Operating
Amplifier Disassembly	B391, Clean Rm	Assembly/disassembly
Target Positioner	B391, Clean Rm	Operating
Chamber Entry	B391, Clean Rm	Maintenance and repair
Vacuum System Operations	B391, Clean Rm	Operating
COMS Certification	B391, Clean Rm	Operating
Crystal Array Assembly	B391, Clean Rm	Assembly/disassembly
Crystal Array Disassembly	B391, Clean Rm	Assembly/disassembly
Silicon Dip Coating	B391, Clean Rm	Assembly/disassembly
Silicon Curing	B391, Clean Rm	Assembly/disassembly
Phase Plate Pre-cleaning	B391, Clean Rm	Maintenance and repair
Spray Booth Procedure	B391, Clean Rm	Maintenance and repair
Clean Room Laundry	B391, Clean Rm	Maintenance and repair
Rod Cleaning and Inspection	B391, Clean Rm	Maintenance and repair

Procedure Title	Area	Category
Prep/Preclean of Amplifiers	B391, Clean Rm	Maintenance and repair
Flashlamp Assembly	B391, Clean Rm	Assembly/disassembly
Pinhole Manipulator Assembly	B391, Clean Rm	Assembly/disassembly
Interstage Hardware	B391, Clean Rm	Operating
Cross Hair Assembly	B391, Clean Rm	Assembly/disassembly
Zygo Interferometer Procedure	B391, Clean Rm	Operating
Optical Transmittance/Reflectance System (OTR) Procedure	B391, Clean Rm	Operating
Polarizer Measurement Procedure for OTR	B391, Clean Rm	Operating
Sol-gel Precoating Cleaning Procedure	B391, Clean Rm	Maintenance and repair
Contamination Control Procedure for all NOVA Clean Areas	B391, Clean Rm	Maintenance and repair
Sol-get Mixing Procedure	B391, Clean Rm	Assembly/disassembly
Parts Validation	B391, Clean Rm	Operating
Debris Shield Precleaning	B391, Clean Rm	Maintenance and repair
Final Cleaning and Coating	B391, Clean Rm	Assembly/disassembly
Alpha Rod Assembly	B391, Clean Rm	Assembly/disassembly
Beta Rod Assembly	B391, Clean Rm	Assembly/disassembly
Gain Setting	Laser Diagnostics	Operating
Editing Special Parameter	Laser Diagnostics	Operating
Timing Streak Cameras on Rod Shots	Laser Diagnostics	Operating
Data Validation	Laser Diagnostics	Operating
Using Retroreflectors in the Target Chamber	Laser Diagnostics	Operating
Splitter Box Configurations for Reflected 2w/3w Light	Laser Diagnostics	Operating
Trimming Fiber Optics for Streak Cameras	Laser Diagnostics	Operating
Aligning Fiber Optic Taper in Output Sensors	Laser Diagnostics	Operating
Aligning Energy Diodes in Output Sensors	Laser Diagnostics	Operating
Check Streak Camera Default Sweep Rates	Laser Diagnostics	Operating
Using the Pulldown Data Base for Calorimeters	Laser Diagnostics	Operating
Creating New Default Sweep Rates using a Workstation	Laser Diagnostics	Operating
Streak Camera Weight Factor	Laser Diagnostics	Operating
Calibrating Amplifiers	Laser Diagnostics	Operating
Building Optical-to-Electrical Converter	Laser Diagnostics	Assembly/disassembly
Boxes	Laser Diagnostics	
Troubleshooting LSI-11s	Laser Diagnostics	Maintenance and repair
Measuring CW Power at Chamber Center	Laser Diagnostics	Operating
ORACLE Overview	Laser Diagnostics	Operating
Reprocessing Streak Data	Laser Diagnostics	Operating
VMS Overview	Laser Diagnostics	Operating
VT Commands for Streak Camera Operation	Laser Diagnostics	Operating
Distribution of Hard Copies	Laser Diagnostics	Operating
Archiving Data	Laser Diagnostics	Operating
Transfers to LEAF	Laser Diagnostics	Operating
Specific ORACLE Reports	Laser Diagnostics	Operating
Adding Comments to pfl Streak Files	Laser Diagnostics	Operating
Trimming Fiber Optics for Streak Cameras	Laser Diagnostics	Operating
Generating Calorimeter Plots	Laser Diagnostics	Operating
SCD5000 and 7250 Scope Operation	Laser Diagnostics	Operating
Recording New Streak Camera Background	Laser Diagnostics	Operating
Swapping in New Streak Cameras	Laser Diagnostics	Installation, removal
Troubleshooting Streak Cameras	Laser Diagnostics	Maintenance and repair
Troubleshooting LSI-11s	Laser Diagnostics	Maintenance and repair
Calibrating Large-Aperture Calorimeters in the E-O Lab	Laser Diagnostics	Operating

Procedure Title	Area	Category
44cm Calorimeter Calibration	Laser Diagnostics	Operating
Operating Streak Software	Laser Diagnostics	Operating
OTDR Overview	Laser Diagnostics	Operating
Rebooting DEPs and FEPs	Laser Diagnostics	Operating
Rebooting LDCONs	Laser Diagnostics	Operating
Retrieving Past Shot Information	Laser Diagnostics	Operating
Selecting Streak Lineouts	Laser Diagnostics	Operating
Setting up for Propagated Rod Shots	Laser Diagnostics	Operating
Spool Cluster Alignment	Laser Diagnostics	Operating
SRS Delay Generator Operation	Laser Diagnostics	Operating
SRS HV Power Supply Operation	Laser Diagnostics	Operating
44 cm Calorimeter Rebuild	Laser Diagnostics	Maintenance and repair
Changing Calorimeters	Laser Diagnostics	Installation, removal
Changing Spectrometer Operations	Laser Diagnostics	Installation, removal
Switchyard Spectrometer Operation	Laser Diagnostics	Operating
Load to ORACLE	Laser Diagnostics	Operating
Updating Sensitivities	Laser Diagnostics	Operating
Changing Fast Timing Channels	Laser Diagnostics	Operating
Calculating and Setting filter Wheels	Laser Diagnostics	Operating
Calibration Laboratory Operation	Laser Diagnostics	Operating
Calibration Shot Calorimeter Setup	Laser Diagnostics	Operating
Changing Sweep Cards	Laser Diagnostics	Installation, removal
Comb Generator Operation	Laser Diagnostics	Operating
Long Pulse Oscillator Alignment	MOR	Operating
Broadband Oscillator (BBO) Alignment	MOR	Operating
Spectrometer	MOR	Operating
Streak Camera Setup (MPL,MFD)	MOR	Operating
Diode Calibration	MOR	Operating
HP Digitizer	MOR	Operating
Tektronix SCD5000 Scope	MOR	Operating
CW Head Rebuild	MOR	Maintenance and repair
Oscillator Heads Rebuild	MOR	Maintenance and repair
Rod Amplifiers Rebuild	MOR	Maintenance and repair
Chiller Power-up and Power-down	MOR	Operating
Stop-Charge Power Supplies	MOR	Operating
SMC Device Mapping	MOR	Operating
Multiple Set Point Mapping	MOR	Operating
Optical Component Index and Layout	MOR	Operating
Len Relay	MOR	Operating
Chirper Beamline Alignment	MOR	Operating
Setup for Long Pulse Shot	MOR	Operating
Setup for Shot Pulse Shot	MOR	Operating
Long Pulse Shot with Long Pulse Backlight	MOR	Operating
Long Pulse Shot with Short Pulse Backlight	MOR	Operating
Short Pulse Shot with Long Pulse Backlight	MOR	Operating
Short Pulse Shot with Short Pulse Backlight	MOR	Operating
Setup for Broadband/XPM Shot	MOR	Operating
Setup for Pulse Compressing/4w Probe Shot	MOR	Operating
MOR Startup	MOR	Operating
Lamp Driver Startup, Safing, and Safeout Authorization Requirements List	MOR	Operating

Procedure Title	Area	Category
Lamp Driver Safeout	MOR	Operating
Shot Checklists	MOR	Operating
Amplifier Safeout/Replacement/Alignment	MOR	Maintenance and repair
Energy Limits Pulse width vs Damage Threshold	MOR	Operating
Short Pulse and FIDU Oscillator Alignment	MOR	Operating
SF6 Gas Handling	MOR	Operating
Illumination Beamline Alignment	MOR	Operating
Pulse Chargers	MOR	Operating
Polarizer Test Station	MOR	Operating
CW Alignment	MOR	Operating
Long Pulse Beamline Alignment including Shaper/Slicer	MOR	Operating
Short Pulse Beamline Alignment and Short Pulse Backlight Alignment	MOR	Operating
FIDU Beamline Alignment	MOR	Operating
BBO/XPM Beamline Alignment	MOR	Operating
Pulse Compression/4w Probe Beamline Alignment	MOR	Operating
Film Calibration Station	MOR	Operating
Nova Power Conditioning Proficiency Certification	Pwr Conditioning	Operating
Lampdriver Safing	Pwr Conditioning	Operating
KVA Fanout Safing Procedure	Pwr Conditioning	Operating
KVA Power Supply Safing Procedure	Pwr Conditioning	Operating
MVA Fanout Safing Procedure	Pwr Conditioning	Operating
Ignitron Safing Procedure	Pwr Conditioning	Operating
Ignitron Hi-potting Procedure	Pwr Conditioning	Operating
Laser Bay Hi-pot Testing Checklist	Pwr Conditioning	Operating
MOR Power Supply Safeout Checklist	Pwr Conditioning	Operating
MOR PFN Safing	Pwr Conditioning	Operating
Target Chamber Entry	Target Bay	Operating
TBLDS Pumping/Venting	Target Bay	Operating
Returning the Target Inserter to Normal	Target Bay	Operating
Chamber Pumpdown	Target Bay	Operating
TBLDS Removal/Installation of Debris Shields, and Phase Plates	Target Bay	Maintenance and repair
Target Short Checklist	Target Bay	Operating
Monthly Chamber Cleaning	Target Bay	Maintenance and repair
Removal/Installation of the Primary Focus Lens	Target Bay	Maintenance and repair
Target Inserter	Target Bay	Operating
Restarting the Vacuum Control System	Target Diagnostics	Operating
Monthly Rack Maintenance	Target Diagnostics	Maintenance and repair
Restarting the Conflict System	Target Diagnostics	Operating
Soft X-Ray Framing Camera (SXFRC)	Target Diagnostics	Operating
High-Bandwidth Digitizer Operation	Target Diagnostics	Operating
Dante X-Ray Diagnostic	Target Diagnostics	Operating
Gated X-Ray Imager (GXI)	Target Diagnostics	Operating
French X-Ray CCD Pinhole Camera	Target Diagnostics	Operating
Large Neutron Scintillator Array (LaNSA)	Target Diagnostics	Operating
Neutron Emission Time (NET) Fiducial Setup	Target Diagnostics	Operating
Time Gated Opacity Spectrometer (TOPS) Setup	Target Diagnostics	Operating
Tritium Handling		Operating

APPENDIX E:

LIST OF ACRONYMS AND DEFINITIONS

APPENDIX E:
LIST OF ACRONYMS AND DEFINITIONS

A

A	Letter "A," safety designation the NIF Operations procedure numbering scheme It appears right after the procedure number (and before the revision number) indicating that "Class A" safety issues are present.
ADMN	Administrative; a procedure category designation in the NIF Operations procedures numbering scheme
AL	Alignment; a functional area designation in the NIF Operations procedures numbering scheme
ALS	Advanced Light Source, located at LBNL, Berkeley, CA.
ASSY	Assembly; a procedure category designation in the NIF Operations procedures numbering scheme
ATP	Acceptance Test Procedure
AVLIS	Atomic Vapor Laser Isotope Separation (a Uranium isotope separation facility, located at LLNL)

B

BTS	Beam Transport System

C

Category	Term delineating the type of procedure (e.g., administrative, installation, assembly, etc.), defined in the NIF Operations procedure numbering scheme.
CEBAF	Continuous Electron Beam Accelerator Facility, located at Jefferson Lab, in Newport News, Virginia.
CCN	Computer Controls/Network; a functional area designation in the NIF Operations procedures numbering scheme.

D

DOE	US Department of Energy, funding and oversight agency for NIF

E and F

FAU	Frame Assembly Unit
First Bundle	Refers to the first bundle of eight laser beams (B31) that will be brought on-line (also referred to as 1st Bundle).
FOA	Final Optics Assembly
Functional Area	Term delineating an operational, physical, or systems area of the NIF Project (e g., LB for Laser Bay, CCN for Computer Controls/Network), defined in the NIF Operations procedure number scheme.

G and H

GEN	General, a functional area designation in the NIF Operations procedures numbering scheme that is not system or area specific

I

ICCS	Integrated Computer Control System
ICF	Inertial confinement fusion.
INST	Installation, a procedure category designation in the NIF Operations procedures numbering scheme
ISS	Integrated Safety System

J

Jefferson Lab	Located in Newport News, Virginia, site of the Continuous Electron Beam Accelerator Facility (CEBAF)

K

Key Word	A word identified as a primary word that can be used to search the NIF Operations procedure on-line system for a particular procedure document

L

LANL	Los Alamos National Laboratory, located in Los Alamos, NM, and one of the four laboratories involved in the development of NIF.
LB	Laser Bay; a functional area designation in the NIF Operations procedures numbering scheme.
LBNL	Lawrence Berkeley National Laboratory, located in Berkeley, CA.
LD	Laser Diagnostics, a functional area designation in the NIF Operations procedures numbering scheme
LLNL	Lawrence Livermore National Laboratory, located in Livermore, CA, and one of the four laboratories involved in the development of NIF as well as the site of that facility.
LTAB	Laser and Target Area Building
Lead Engineer	A position in the NIF Project having overall responsibility for a particular system element (at the third level of the WBS) from engineering design through acceptance testing
LRU	Linc Rcplaccablc Unit

M

MOR	Master Oscillator Room, an area in NIF where pulse generation is initiated.
MP	MOR/PAMMA, a functional area designation in the NIF Operations procedures numbering scheme.
MTNC	Maintenance, a procedure category designation in the NIF Operations procedures numbering scheme

N

NIF	National Ignition Facility, located at LLNL.
NIFOPS	NIF Operations, a prefix of the NIF Operations procedures numbering scheme indicating that the procedure is part of NIF Operations (and not, for example, NIF Project Procedures, Operational Test Procedures, or Acceptance Test Procedures).

N
(continued)

Nova	An existing laser facility (precursor to NIF) operating at LLNL, Livermore, CA.

O

OAB	Optics Assembly Building, a functional area designation in the NIF Operations procedures numbering scheme
OP	Optics Processing, a functional area designation in the NIF Operations procedures numbering scheme
OPER	Operating, a procedure category designation in the NIF Operations procedures numbering scheme
OPG	Optical Pulse Generation
ORR	Operational Readiness Review
OTP	Operational Test Procedure.

P

PABTS	Preamplifier Beam Transport System
PAM	Preamplifier Module
PAMMA	Preamplifier Module Maintenance Area
PC	Power Conditioning; a functional area designation in the NIF Operations procedures numbering scheme
PCS	Power Conditioning System
PD	Precision Diagnostics, a functional area designation in the NIF Operations procedures numbering scheme.

P (continued)

PDM-I or PDM-II	Product Data Management-I system is a computer data base used to track NIF design and construction (trade name Sherpa); Product Data Management -II is a new system, yet to be procured, which will function as a NIF Operations data base
PEPC	Plasma Electrode Pockels Cells
Procedure Owner	A NIF Operations staff person, typically an operator, who is responsible for maintaining the accuracy of a given procedure
Procedure Writer	An engineer responsible for developing NIF Operations procedures in collaborations with Lead Engineers or technical experts

Q, R, and S

SLAC	Stanford Linear Accelerator Center, Stanford University, Stanford, CA
SNL	Sandia National Laboratory, located in Albuquerque, NM, and Livermore, CA, and one of the four laboratories involved in the development of NIF
SY	Switchyard, a functional area designation in the NIF Operations procedures numbering scheme

T

T-1	Reference to time, T-1 seconds, when Abort System can shut down a shot
TB	Target Bay; a functional area designation in the NIF Operations procedures numbering scheme
TD	Target Diagnostics; a functional area designation in the NIF Operations procedures numbering scheme
Technical Expert	An engineer who is an expert in that particular area and who may or may not be part of the NIF Project
TRNG	Training, a procedure category designation in the NIF Operations procedures numbering scheme

U, V, W, X, Y, and Z

UR/LLE	University of Rochester, Laboratory for Laser Energetics, located in Rochester, NY, and one of the four laboratories involved in the development of NIF.
USDOE	See DOE
WBS	Work breakdown structure, a numbering scheme used to identify discreet design areas of the NIF Project, also used for budgeting and reporting purposes.